

State of Alaska

Department of Community and
Economic Development

Operational Management



Instructor's Guide
November 2003

Operational Management

Of Small Rural Alaska Water Systems

Instructor's Guide

State of Alaska
Department of Community and Economic Development
Rural Utility Business Advisor Program

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Research, Written and Designed by

Derek Chambers, P.E.
Tanana Chiefs Conference
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DCED 2002-3 Project Managers

Scott Ruby
Greg Gould

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Background for the Course

This course was developed as one of the series of six courses to provide utility managers of small sanitation facilities a basic understanding of the principals and practices involved in managing water and wastewater sanitation facilities. Each course is a 32-hour class designed to be presented in week-long workshops.

The first course in the series is Introduction to Utility Management. This course provides an overview of what it means to manage a utility and breaks the management of a utility into five sections: organizational management, personnel management, planning management, financial management, and operational management. The five remaining courses each cover these topics in greater depth. The order that a student completes the courses is unimportant other than the Introduction to Utility Management course should be taken first. It is hoped that by the time the utility manager completes all six of these workshops, they will have a good understanding of the tools needed to address most of the issues that they will face in managing a utility.

Often we are asked, “who should attend this class?” The classes are targeted at managers of water and wastewater systems in communities with a population between 100 and 1,500. Communities smaller than 100 will usually have very limited systems and staff, and don’t need to, nor have the capabilities to do most of the processes described in this course. Those systems that serve communities over 1,500 in population typically have contracted or hired experienced professional staff that have already implemented the processes described here. What if there is not a person with the title of utility manager? There may not be a person with that title however, there is usually one person that is responsible for overseeing the day-to-day operation of the utility. This person can actually be a Council Member, a Mayor, a Chief, an Operator, or the Clerk. The easiest way to identify this person is to ask either the clerk or the operator “If a customer came to you with a complaint that you could not fix immediately, who would you tell them to talk to?” That person is the one who assumes the utility manager’s duties.

Operational Management Course

This course has specifically designed tools a utility manager needs to keep the water system running safely and efficiently. Topics of the course include:

- Safety
- Operation and Maintenance Scheduling
- Data Collection and Reporting
- Public Relations
- Inventory Control
- Contingency Planning

While this class is designed to be presented in a weeklong workshop, each unit can be presented independently in a one-on-one on-site session at the utility, or can be studied independently by the utility manager.

Specific Course Suggestions

Many of the exercises in this course ask the manager to do some kind of self assessment of their own utility. For example, in Unit 1, there is an exercise about performing a hazard assessment, and in Unit 6, there is an exercise about performing a security vulnerability assessment. Encourage the class participants to go through these exercises “for real” using their own utility as their example. That way, when this course is over, they will have a product that they can take back to their utility and use.

It is suggested that students bring a copy of their current water quality data so that they can write a Consumer Confidence Report (CCR) with their own data. Participants may be notified of this suggestion in several ways. First, the course announcement and any registration materials should note the suggestion. Second, if additional one-on-one follow up is made with the participant, the participant can be reminded of this suggestion. Sample water quality data for a fictional community are provided in the exercises in Unit 4—Public Relations, for those students that do not have water quality data of their own.

Support Materials and Room Setup Suggestions

Teaching material checklist:

- | | |
|---|---|
| <input type="checkbox"/> Copies of exercises (and any exercise material) | <input type="checkbox"/> Daily sign-in sheet |
| <input type="checkbox"/> Copies of reference material | <input type="checkbox"/> Prizes |
| <input type="checkbox"/> Overhead projector | <input type="checkbox"/> Computer projector (if using PowerPoint instead of overheads) |
| <input type="checkbox"/> Overheads | <input type="checkbox"/> Instructor's Guide for each instructor |
| <input type="checkbox"/> Screen for overhead projector | <input type="checkbox"/> Name tags with students name and community |
| <input type="checkbox"/> Extension cord | <input type="checkbox"/> Desk tents with students name and community |
| <input type="checkbox"/> Flip charts and easel | <input type="checkbox"/> Completion certificates |
| <input type="checkbox"/> Broad tipped markers for flip charts | <input type="checkbox"/> Kitchen timer |
| <input type="checkbox"/> White board markers (if necessary) | <input type="checkbox"/> Laptop computer w/ appropriate software (PowerPoint, Access, IExplorer, Outlook) |
| <input type="checkbox"/> Masking tape for hanging up flip chart sheets on walls | |
| <input type="checkbox"/> Student registration forms | |

Provide for each student:

- | | |
|--|--|
| <input type="checkbox"/> Student Manual w/ CD | <input type="checkbox"/> Yellow highlighter |
| <input type="checkbox"/> Note pad or blank paper | <input type="checkbox"/> Pens and or pencils |

Students should bring:

- ☐ Copy of current water quality data

Contact the students in advance of the course and ask them to bring the water quality data.

Room setup checklist:

- ☐ Is there enough room to have a separate area for the lecture and exercises?
- ☐ Are electric outlets close to where you need them? Do they work?
- ☐ Are chairs and tables set up to allow clear view of screen for each student?
- ☐ Do all students have enough room to lay out materials?
- ☐ Do you know location of light switches, heating controls, emergency exits, and restrooms?
- ☐ Do you know if the meeting room administrators allow taping flip charts up on the walls?
- ☐ Are arrangements made for snacks and beverages?

Layout of the Instructor's Guide

The Instructor's Guide is divided into 3 sections and contains both instructions for the instructor and the complete Student Manual. **Section A** contains instructions for the instructor and general information about using this manual and how it is arranged.

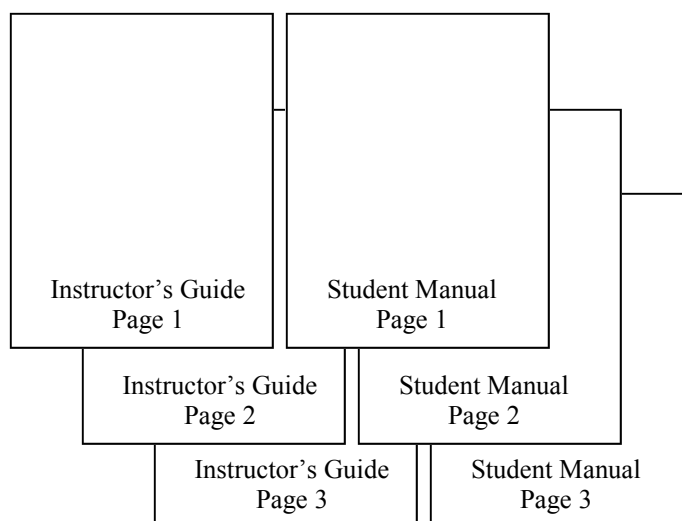
Section B contains the complete student manual. Each student manual sheet, found on the right hand side, is accompanied by a corresponding Instructor's Notes page on the facing left hand side. Both pages are keyed to a certain overhead, which is displayed at 1/4 size on the student page and thumbnail size on the instructor's side.

It is anticipated that the overheads will be the focal point of the teaching. The *Speaker Notes* are keyed to the points listed on the overhead. It is **strongly recommended** that the instructor take time before the class to jot down some notes of personal experiences in this section. In teaching these workshops over the past several years, we have found that it was real life examples that have created the greatest connections with the students. These connections are the key in getting discussions going as the course progresses.

A suggested lesson length and suggested schedule can be found on the first Instructor's page for each Unit. Exercises and breaks are spread out throughout the course to maximize activity and class participation.

Section C contains all the handouts to be photocopies for the exercises. A note at the bottom of each page in section C tells how many copies of each page to make.

A computer CD of reference material has been developed to accompany this text. The CD is not required to teach the course, but is meant as back-up material for the participant to take home. The CD contains the full text of both the Instructor's Guide and the Student Manual; all PowerPoint presentations; MS Word versions of the forms developed for this course plus some useful reference material from ADEC, ADCED, ADOL, ASDWA, and EPA. The reference material also includes several pertinent sections of the Alaska Administrative Code. All files on the CD are hyperlinked from a web page that starts up automatically when the CD is loaded in the computer.



Delivery Sequence

The Operational Management course consists of an overview/introduction, six units, and a course review. The overview/introduction and course review include the pre and post self assessments so the presentation sequence for them will be unique. The presentation sequence for the six units is stated at the beginning of each unit. Each of these 4-hour blocks will contain time for discussion of the topic(s), time for exercises, time to complete the work sheet and discuss the worksheet, time for to complete the action plans, and approximately 10 minutes for breaks. The suggested sequence at the beginning of each unit can be adjusted to fit the needs of the class, based on the class expectations exercise.

The overview/introduction, which contains the pre-self assessment, has this sequence:

- welcome remarks
- housekeeping items
- icebreaker exercise
- introduction lecture (utility management courses & operational management overview)
- students pre self assessment
- review self assessment
- set individual goals for the class
- decide if any units will be given special attention based on self assessments

In the course review the key is to leave enough time to discuss the retaking of the self assessment, and where students feel that they improved, and where they felt they made little or no improvement. To do this, the recommended sequence is:

- review of material
- students take post self assessment
- discuss self assessments with students
- complete action plans
- hand out certificates (if you have them or they will be mailed to them later).

The following is a suggested schedule for the week.

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00am-12:00pm		Unit 1 Safety	Unit 3 Data Collection & Reporting	Unit 5 Inventory Control	Course Review
1:00pm-5:00pm	Overview/ Introduction	Unit 2 Scheduling Work	Unit 4 Public Relations	Unit 6 Contingency Planning	

Depending on where the class is held, it may be possible to schedule a tour a water treatment or waste water treatment facility. If that is the case, then some of the exercises can be condensed or dropped and the schedule adjusted.

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00am-12:00pm		Finish Unit 1 Start Unit 2	Finish Unit 3 Start Unit 4	Finish Unit 4 Start Unit 5	Finish Unit 6 Course Review
1:00pm-5:00pm	Overview/ Introduction Start Unit 1	Finish Unit 2 Start Unit 3	Water or waste water plant tour	Finish Unit 5 Start Unit 6	

Pre-Self Assessment and Post Self-Assessment

The pre-self assessment and post-self assessment are not used to judge a specific level of competency for the course. Both assessments ask the same questions and they are in the same order. This makes each assessment useful in two ways. The first is to see how much each student learned during the class. The second is to evaluate how well the class was taught.

Based on past experience is typical to see a 30% to 60% increase in scores from the pre-self assessment to post-self assessment. However, if the students scored high on the pre-self assessment, it common for the increase to be under 10%.

The most useful purpose to the pre-self assessment and post self assessment is to guide the instruction. Looking at the topics on the pre self assessments where students rated their own knowledge or abilities at the lowest level will give the instructor an idea of which areas need to be emphasized while teaching the course. Evaluating which questions the students rated lowest on the post self assessment sometimes reveal ideas discussed during the class that were presented in a confusing and contradictory way. While this is of little use to the students of that class, it will help improve this course for future classes.

The pre and post self assessments consist of 6 pages, one page for each of the units in the course. Each page asks the class participant to rate themselves on between 4 and 7 skills or abilities. There is no answer key since the assessment measure the students own knowledge or ability.

More information about how the self assessments work is given in the Instructor's Notes on pages PRE SA-1, PRE SA-6, POST SA-1 and POST SA-6.

Using the Overheads

The overheads are the primary visual tool used to present the course material. We have found that using the overhead transparencies works best. Overhead projectors are found in most regional centers and don't require the instructors to haul equipment to the location. The overheads are also available as a PowerPoint presentation but that requires the instructor to bring a portable computer and the special projector to the workshop. Both of the items must be carried as hand luggage on all planes. Each Unit is a separate PowerPoint file. All the files total approximately 3MB in size, so they would have to be put onto several floppy disks, a zip disk or CD.

The course material is integrated with the overheads. Advise the students if an overhead is skipped or reordered so that they will not be confused with the order found in their student manual.

Sample overheads:

[illegible]

Using the Exercises

The exercises developed for this course focus on building skills with result being an actual working document that can be taken back to the utility and implemented. For this reason, some of the exercises should not be skipped since they are building blocks for a subsequent exercise. The self assessment and class expectations should be used to determine which skill areas and therefore which exercises to focus on.

Exercises are a key piece of the Operational Management course materials. In designing the training, there were several reasons for including a large number and various types of exercises. They allow the participants to apply principles and ideas being taught, since learning by listening is only so effective. By allowing/ requiring the participants to apply techniques or approaches to situations, they develop a greater understanding of the topic and how it can be applied in their utility. It also allows them to learn about some of the pitfalls that can happen!

Another reason for using exercises is to vary the pace of the workshop. It is strongly encouraged that there be separate areas for listening to the lecture and doing the exercises. This gets the participants up and physically moving and it allows them to keep their books and materials in one place without having to clear the tables to do the exercise or break into groups.

The exercises vary between individual, small groups, and large groups. Twelve people per class is ideal because that number can be easily divided into groups of 1,2,3,4, or 6. We have found that groups of 3 or 4 work best. It allows everyone to participate but it is not so large that a couple of people do all the work. Whether to keep the same small groups together throughout the course or to constantly change them really depends on the personality of the participants. If the participants seem to be shy, it is better to keep the groups the same. This allows them to become comfortable with their teammates throughout the week.

Using the Worksheets

At the end of each Unit is a short worksheet. The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion. Allow time for class participants to complete the worksheets, then review them orally. Suggested answers and reasons for the answers can be found on the Instructor's Notes page. Participants answers may vary from the suggested answers. If they do, ask the participant why they answered the way they did. Their response may make more sense than the suggested answer!

Using the Action Plans

Doing Action Plans grew out of a need for helping the participants with follow up. The course introduces a large amount of information, ideas, and processes. Ideas that come to students in the early part of the workshop tend to get lost by the end of the workshop.

The idea of the Action Plan is for the students at the end of each Unit to write down at least one thing (and no more than three) that they learned during that lesson that could be done in their community to improve things. On the final day after the post self assessment, participants can take the six actions plan sheets that they have and prioritize the top three things that they feel need to be done and can be accomplished in their community.

Generally, as part of the summary wrap up, a flip chart can be put up for each community and the top three action plan items can be listed and discussed. This is useful for a variety of reasons:

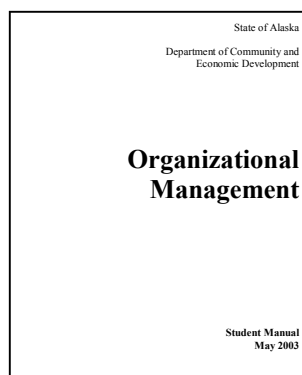
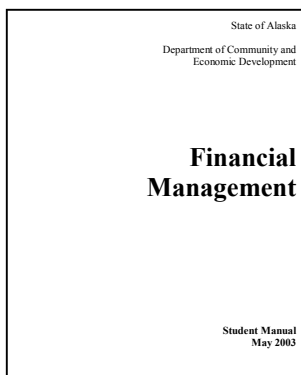
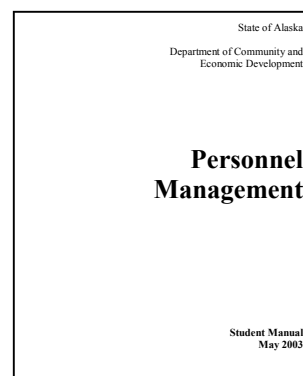
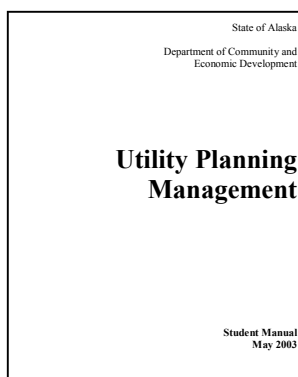
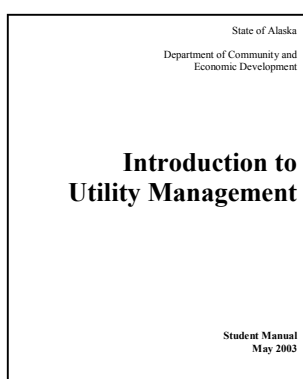
- It gives the participants a chance to say what they feel and sometimes modify or add to their action plan list.
- It gives the participants a chance to see what other communities are struggling with, that they are doing, and it opens up opportunities for networking between communities.
- The instructor can take note of what participants are focusing on. This can give a hint at where the training was successful or where more training may be needed.

Class Evaluations

We usually close out a class with a verbal evaluation, allowing each participant to express one thing that they particularly enjoyed about the class, and one thing that they would like to see changed. We call this evaluation our “plus/delta” (+/Δ). We always note the comments on a flip chart, then transpose the notes to our archives. We have used past suggestions to change the time of year for some training classess (avoiding hunting season), stay away from some hotels with bad food or service, and increase activities in class like exercises and discussions.

Reference Materials

It is recommended that all of the student manuals for all of the DCED Utility Management Program’s courses be available. You can set up a table in the back of the room for the student manuals to be displayed on during the week.



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Section B

Course Material

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Overview and Introduction

Instructor's Notes

Overview and Introduction—Page 1

Instructor class preparation

1. This overview starts with an icebreaker exercise. Make sure that you are familiar with the icebreaker exercises in Section C or have chosen an alternative icebreaker to use. Become familiar with them before the class and make sure you have all your materials and copies made.
2. It is suggested that you do not try to ask for class expectations until after the participants have taken the pre-self assessment. This will give them a better idea of their current abilities, and will probably change what they want to get out of the class.

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Lesson Length: 4 hours

Schedule:

- Welcome/Icebreaker 30 min
- Overview of Training Program 30 min
- Intro to Operational Mgt 30 min
- Break 15 min
- Self Assessment 30 min
- Self Assessment discussion 30 min
- Expectations for rest of class 45 min
- Review of Water Terms 30 min

Speaker Notes

Slide O-2

1. Start the class on-time and cover the administrative “house keeping” items like:
 - What time class starts each day and schedule for the week
 - Where participants get meals
 - How travel is reimbursed (if available)
 - Where restrooms are
 - What materials are provided and what participants need to supply for themselves (if anything)
 - What constitutes appropriate classroom behavior (ground rules)
 - Action taken if participants do not attend class
2. Instead of going around the room and each person introducing themselves, try using one of the icebreaker exercises listed in Section C. This gets them used to working in groups and sets the tone for open discussions later in the course.
3. After the icebreaker, explain the overall purpose of this course, which is: ***To practice critical skills regarding the manager's role in the operation of a water utility, to increase the confidence of the manager so that they can implement the skills when they return to their village.***
4. Explain the schedule for the day (the overview and introduction section) and what the learning objectives are for this section.
5. Discuss what a “Utility Manager” is in the context of village life in Alaska.
6. Start the discussion of the Utility Manager Training Program offered by DCED.



Overview and Introduction—Page 1

Learning Objectives

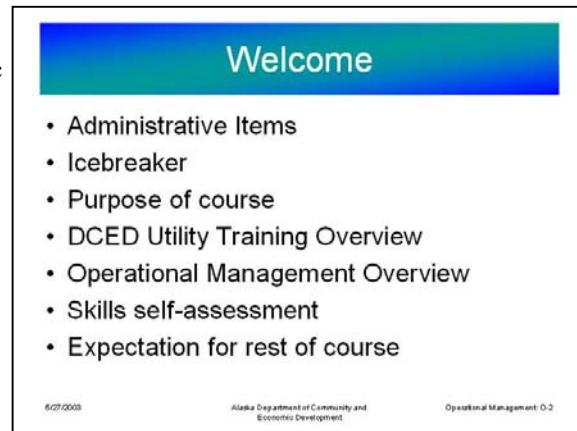
After completing this section you should be able to identify the six courses that make up the DCED Utility Manager Training Program, explain why DCED offers Utility Management Training, and identify and briefly describe the six lessons (not including the overview) that make up the Operational Management Course.

Overview

This unit is an introductory lesson that describes the basic outline of the DCED Utility Manager Training Program and the outline of the six Units that make up the Operational Management Course. A self-assessment of knowledge and skills at the end of this unit will provide some direction for what areas to focus on during the rest of the course.

What is a Utility Manager?

A Utility Manager is the person (or persons) that is responsible for the budget and supervises the people that operate a water and sewer system. Most rural communities in Alaska do not have a person whose job title is only “Utility Manager”. Usually these managers wear many hats in the community, and the management of the water and sewer utility is only a small portion of their job. The utility manager may be the city administrator, the tribal administrator, a city or tribal council board member, mayor, health director, or the water or sewer operator. In some cases the utility management duties are divided among several people.



Utility Manager Training Program

Small and rural communities in Alaska often lack the resources to recruit and employee trained utility managers to run their sanitation facilities. In some cases, this has resulted in the facilities not being operated as efficiently as possible. User fees have had to increase to meet operating costs or services have had to be reduced because of a lack of revenue to cover all the mounting expenses. In extreme cases, water systems have failed due to lack of proper maintenance. Since clean water and proper wastewater disposal are so essential to maintaining good health, and are often the foundation for economic health of a community, the State of Alaska has implemented several programs to try to improve the operation and maintenance of these systems in rural Alaskan communities. One of these programs is the development of a series of Utility Manager Training Courses. This course is one of those courses.

References used to develop this Unit

- Introduction to Utility Management, State of Alaska, Department of Community and Economic Development, 3rd Edition, December 1999
- Utility Planning Management, State of Alaska, Department of Community and Economic Development, Rural Utility Business Advisor Program, September 2000
- Organizational Management, State of Alaska, Department of Community and Economic Development, Rural Utility Business Advisor Program, June 1999
- Personnel Management, State of Alaska, Department of Community and Economic Development, Rural Utility Business Advisor Program, February 2001
- Financial Management, State of Alaska, Department of Community and Economic Development, Rural Utility Business Advisor Program, August 2002

Instructor's Note

Overview and Introduction—Page 2

Speaker Notes

Slide O-3

1. Explain that the DCED Utility Manager Training Series consists of six 32 hour courses as listed.
2. This course is one of those courses (Operational Management)



Slide O-4

1. Explain that the first course in the series is Introduction to Utility Management, and contains a brief overview of each of the other five subjects.
2. Give examples of the types of things covered in the course and who the course is meant for.



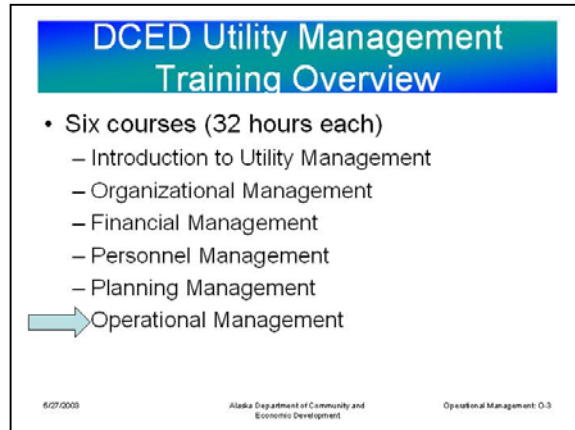
Overview and Introduction—Page 2

DCED Utility Management Training Series Overview

There are six Utility Management courses offered by DCED. They are:

1. Introduction to Utility Management
2. Organizational Management
3. Financial Management
4. Personnel Management
5. Introduction to Utility Planning
6. Operational Management

Each course is 32 hours long (4 days). This course is but one of those weeklong courses—Operational Management. A short description of each of the six courses follows:



DCED Utility Management Training Overview

- Six courses (32 hours each)
 - Introduction to Utility Management
 - Organizational Management
 - Financial Management
 - Personnel Management
 - Planning Management
 - Operational Management

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Overview

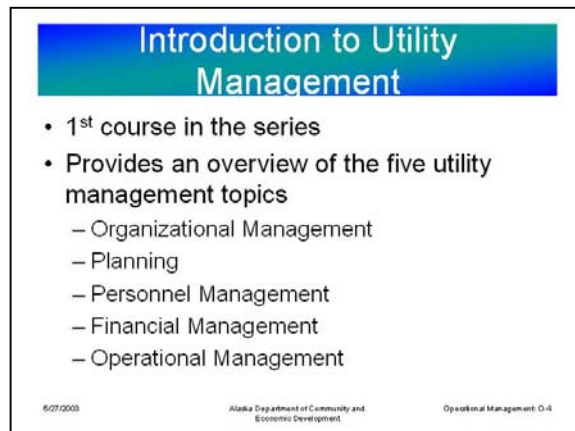
Introduction to Utility Management

The Introduction to Utility Management is the first one of the course series.

The course provides an overview of the five utility management topics:

- Organizational Management
- Personnel Management
- Financial Management
- Planning Management
- Operational Management

The goal of the 32 hour Introductory course is to provide utility managers of small water and sewer facilities a basic understanding of the principles and practices involved in managing their facilities. Small facilities means communities of 100-1500 in size. By taking the introductory course, students should be well prepared to go on to the more advanced courses on each specific topic.



Introduction to Utility Management

- 1st course in the series
- Provides an overview of the five utility management topics
 - Organizational Management
 - Planning
 - Personnel Management
 - Financial Management
 - Operational Management

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Instructor's Notes

Overview and Introduction—Page 3

Speaker Notes

Slide O-5

1. Explain that Organization Management is one of the topics covered in it's own course.
2. Give examples of the types of things covered in the course and who the course is meant for.



Slide O-6

1. Explain that Financial Management is one of the topics covered in it's own course.
2. Give examples of the types of things covered in the course and who the course is meant for.



Overview and Introduction—Page 3

Organizational Management

This course is designed to provide more detail on the following concepts of Organizational Management.

- What is an organization
- Accountability
- Level of Service
- Public Relations
- Utility Ordinance
- Work Space Management
- Customer Agreements
- Agencies and outside help
- Roles and responsibilities
- Regulations

Organizational Management

Achieving efficiency through a well thought out organizational structure.

<ul style="list-style-type: none"> • What is an organization? • Accountability • Level of Service • Utility ordinance • Roles & Responsibilities 	<ul style="list-style-type: none"> • Public Relations • Record Keeping • Work space management • Agencies/Outside Help • Customer Agreements • Regulations
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Alaska Department of Community and Economic Development
Operational Management: O-6

The course discusses various forms of local organizations that may own, govern, or manage and operate water and waste water utilities in Alaska. The course addresses the governance of a utility, including local laws and legal documents.

The course focuses on the organization of the entity that will manage and operate the utility including an overview of the responsibilities, authority, and accountability of personnel.

Financial Management

This course describes the two main elements to Financial Management.

For a utility, Financial Management has two basic systems: a financial information system and a management information system.

Financial Information System. This section of the course includes information on: procedures and record keeping requirements, accounting processes, payroll and purchasing, billing, and collections and budgeting.

Financial Management

Bookkeeping, budgeting and support functions.

<ul style="list-style-type: none"> • Authorizing documents • Annual operating budgets • Reserves • Accounting processes • Payroll • Purchasing 	<ul style="list-style-type: none"> • Management Reports • Financial Reporting • Rate Setting • Billing and Collections • Risk Management • Insurance • Financial Audits
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6/27/2003
Alaska Department of Community and Economic Development
Operational Management: O-6

Management Information: This section of the course includes information on: procedures and reports that allows the manager to determine how well the utility is meeting the needs of the customers and the goals set out in the annual operations plan. During this course you will gain information on establishing utility rates. The section also presents reporting procedures to ensure funds and assets are used properly. In addition, this section offers information on risk management, insurance, preparing management reports, and authorizing documents, and financial audits.

Instructor's Notes

Overview and Introduction—Page 4

Speaker Notes

Slide O-7

1. Explain that Personnel Management is one of the topics covered in it's own course.
2. Give examples of the types of things covered in the course and who the course is meant for.



Slide O-8

1. Explain that Planning Management is one of the topics covered in it's own course.
2. Give examples of the types of things covered in the course and who the course is meant for.



Slide O-9

1. Explain that Operational Management is one of the topics covered in it's own course (this course).
2. Give examples of the types of things covered in the course and who the course is meant for.



Overview and Introduction—Page 4

Personnel Management

This course describes the tools a utility manager needs to keep the work force working to its fullest.

Topics are focused on Human Resource Management and include:

- People, leadership, and management skills
- Safety policies and programs
- Employee policies and procedures
- Effective communication



Personnel Management

Keeping the workforce working to their fullest.

- People, leadership and management skills
- Safety policies & programs
- Employee policies & procedures
- Effective communication

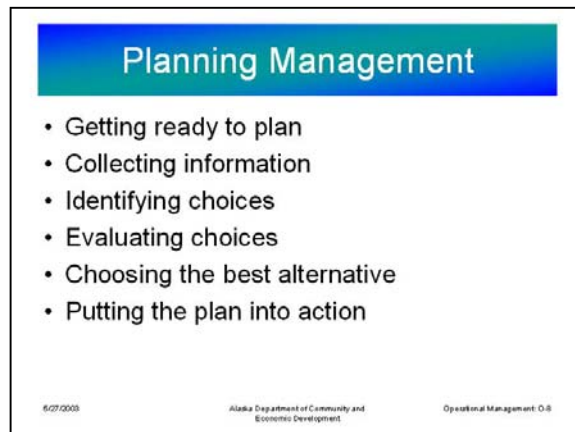
6/27/2003 Alaska Department of Community and Economic Development Operational Management: O-7

Planning Management

This course covers six main topics, which include:

- Getting Ready to Plan
- Collecting Information
- Identifying choices
- Evaluating choices
- Choosing the best Alternatives
- Putting the plan into action

This course leads the student through the whole planning process including why it is important to get the public involved in the planning process, how to get the public involved, how to develop water and sewer alternatives and evaluate them, and how to get a construction project started.



Planning Management

- Getting ready to plan
- Collecting information
- Identifying choices
- Evaluating choices
- Choosing the best alternative
- Putting the plan into action

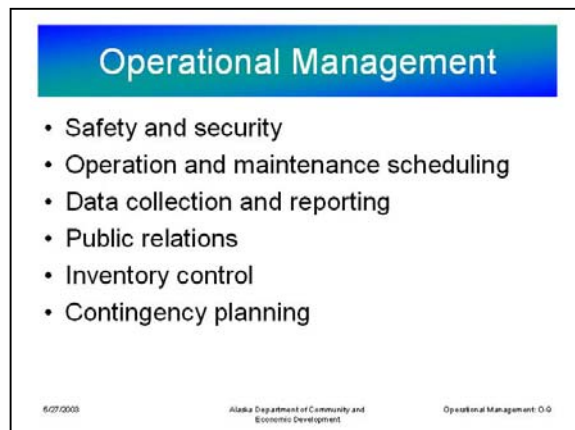
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Operational Management

This course focuses on specific skills and knowledge the Utility Manager needs to efficiently run the utility.

Topics covered in this course include:

- Safety
- Scheduling Work
- Data collection and reporting
- Public relations
- Inventory control
- Contingency planning



Operational Management

- Safety and security
- Operation and maintenance scheduling
- Data collection and reporting
- Public relations
- Inventory control
- Contingency planning

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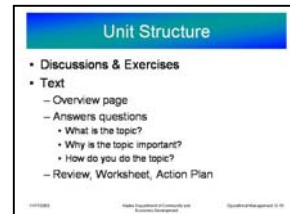
Instructor's Notes

Overview and Introduction—Page 5

Speaker Notes

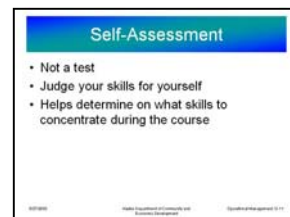
Slide O-10

1. Explain that each of the six units of this course can be taught as a stand alone subject, one-on-one with the manager in their village, or as a part of the weeklong course.
2. Explain that each of the six units is structured similarly. On the first page of the Unit, the text outlines:
 - Learning Objectives
 - Key Concepts
 - Key Terms
3. Explain that the text in each unit attempts to answer three questions about the topic:
 - What the topic is
 - Why the topic is important
 - How to go about implementing the topic
4. Explain that at the end of each unit is a short review, a quick worksheet, and a space for an Action Plan.
5. Some units have blank forms that can be photocopied located after the worksheet.



Slide O-11

1. Explain that at the end of this overview, each participant will conduct a self-assessment. It is not a test, there is no grade. This will help each participant determine what they want to get out of this class.
2. Explain that on the last day of class, they will perform another self-assessment to see if they met their expectations.
3. Explain that after the post-self assessment, they will compile an Action Plan for what they will do once they return to their village.
4. Also explain how the verbal evaluation of the class will be conducted.



Overview and Introduction—Page 5

Unit Structure

Each Unit in the Operational Management course can be taught as a stand alone subject, as well as a part of the weeklong course. The focus of each unit is to learn one or more critical skills. The goal of each unit is for the Utility manager to have practiced using the new skill so that when he or she returns to the village, they will have confidence that they can implement the skill or procedure.

The text of each unit attempts to answer three questions about the topic for that Unit:

- What is the topic? (definition)
- Why is the topic important?
- How you go about performing or implementing that topic?

The Unit has a short lecture and one or more exercises where skills can be developed and practiced. There is also a short review of the Unit including a quick worksheet. Following the worksheet is a space to fill in an Action Plan to implement material learned in that Unit.

Pre-Self Assessment

At the end of the first day, after the Introduction to Operational Management Unit, you will perform a pre-self assessment of your Operational Management Skills and knowledge. This is not a test. This is a way for you to see what kind of skills and knowledge that we think is important for you to know about, and for you to judge for yourself where your abilities stand. After the self assessment, we will discuss your expectations for the rest of the class, and set some goals for what you would like to learn. This will help us determine what exercises to concentrate on most. If most of the class is very proficient in one skill already, then we may breeze over it, and move on to another one that you all would like to cover in more depth.

Post-Self Assessment

On the last day, I would like you to take the self assessment again. This will help you review all the skills that were covered during the course. Hopefully you will find that your self assessment score has improved, but you may find that it has gone down, because you now understand that you did not know as much about each subject as you thought you did before we started the class. Whether your score goes up or down from the pre-self assessment to the post-self assessment is not really important. What is important is that you know what it takes to run an efficient utility, and that you know and practice the skills.

Class Wrap—Up

After the post-self assessment, we will conduct an evaluation of the whole class by going around the room and asking each of you to name one thing that you liked about the class (could be anything from the time of year, food, or location to the subject matter covered) and one thing that you would change about the class. This helps us improve the whole training program.

Unit Structure

- **Discussions & Exercises**
- **Text**
 - Overview page
 - Answers questions
 - What is the topic?
 - Why is the topic important?
 - How do you do the topic?
 - Review, Worksheet, Action Plan

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Operational Management: O-10

Self-Assessment

- Not a test
- Judge your skills for yourself
- Helps determine on what skills to concentrate during the course

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Operational Management: O-11

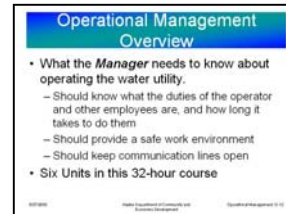
Instructor's Notes

Overview and Introduction—Page 6

Speaker Notes

Slide O-12

1. Explain what is meant by “Operational Management”: That is it what the **Manager** needs to know about operating the water utility. It not how to add chlorine to the water, or dig up a service line, but it is how to schedule time for the operator to do these things, among other things.
2. Explain that Operational Management means that the Manager should know what the operator's duties are and how long it should take to do those duties.
3. Explain that this course has six units and that they are listed in the text.
4. Explain that the focus of the course is on developing skills.



Slide O-13

1. Explain that the next slides provide an outline for the whole course, and what is covered in each Unit.
2. Review what is covered in Unit 1—Safety.
3. Don't worry about getting into details of the Unit, this is just to let the participants know what is coming up.



Overview and Introduction—Page 6

So what does operational management mean?

The utility manager does not necessarily have to know how to operate a water treatment (although that knowledge may come in handy) to manage the utility. Adding chemicals, repairing leaks, and checking pumps are the water plant operator's responsibilities. The utility manager should know what the water operator's duties are, not necessarily how to perform those duties. Operational management involves determining what tasks are required to operate the facility and determining how much time an operator needs to perform those tasks. Operational management also includes insuring that the work environment is as safe as possible, that there are adequate resources available for the operator to perform his job, and that communication lines are open between the customers, the utility, the managing board, and the regulators. This course is divided up into six units after the introduction:

- Safety
- Operation and maintenance scheduling
- Data collection and reporting
- Public relations
- Inventory control
- Contingency planning

This course focuses more on how to perform specific skills in operational management rather than general theory. It is the goal of this course for you to be able to go back to your utility with the tools and skills in hand to implement all of the topics covered.

The following is a brief outline of what is covered in each of the six units in this course.

Unit 1—Safety

In this unit, the utility manager will learn:

- How to perform a hazard assessment
- How to mitigate hazards in the workplace
- How to communicate about hazards to your staff
- How to determine what safety equipment and training are needed
- What a safety policy is

**Operational Management
Overview**

- What the **Manager** needs to know about operating the water utility.
 - Should know what the duties of the operator and other employees are, and how long it takes to do them
 - Should provide a safe work environment
 - Should keep communication lines open
- Six Units in this 32-hour course

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Operational Management O-12

Safety

The Utility Manager's role in providing a safe work environment.

- Getting all staff involved in safety
- Hazard assessments
- Hazard mitigation
- Hazard communication
- Safety equipment & training
- Safety policy development

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Operational Management O-13

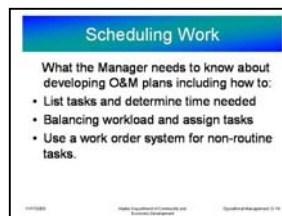
Instructor's Notes

Overview and Introduction—Page 7

Speaker Notes

Slide O-14

1. Review what is covered in Unit 2—Scheduling Work.
2. Don't worry about getting into details of the Unit, this is just to let the participants know what is coming up.



Slide O-15

1. Review what is covered in Unit 3—Data Collection and Reporting.
2. Don't worry about getting into details of the Unit, this is just to let the participants know what is coming up.



Slide O-16

1. Review what is covered in Unit 4—Public Relations.
2. Don't worry about getting into details of the Unit, this is just to let the participants know what is coming up.



Overview and Introduction Page—7

Unit 2—Operation and Maintenance Scheduling

In this unit, the utility manager will learn how to develop operation and maintenance plans including how to determine:

- What tasks go in the schedule
- How much time to allow for tasks
- How to balance the workload
- How to schedule and track routine and non-routine tasks

Scheduling Work

What the Manager needs to know about developing O&M plans including how to:

- List tasks and determine time needed
- Balancing workload and assign tasks
- Use a work order system for non-routine tasks.

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Economic Development

Operational Management O-14

Unit 3—Data Collection and Reporting

In this unit the utility manager will learn:

- How to decide what data to collect
- How to develop forms for collecting data
- How to analyze and use data
- How to report data

Data Collection and Reporting

- Deciding what data to collect
- Developing forms for data
- Analyzing and using data
- Reporting data

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Economic Development

Operational Management O-15

Unit 4—Public Relations

In this unit the manager will learn:

- How to run an effective staff meeting
- How to write Consumer Confidence Reports
- How to use Trouble Tickets
- How to develop community outreach

Public Relations

- Staff Meetings
- Consumer Confidence Reports
- Trouble Tickets
- Community outreach

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Economic Development

Operational Management O-16

Instructor's Notes

Overview and Introduction—Page 8

Speaker Notes

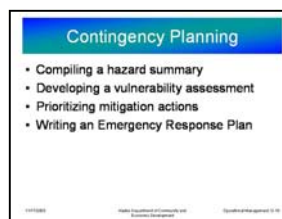
Slide O-17

1. Review what is covered in Unit 5—Inventory Control
2. Don't worry about getting into details of the Unit, this is just to let the participants know what is coming up.



Slide O-18

1. Review what is covered in Unit 6—Contingency Planning.
2. Don't worry about getting into details of the Unit, this is just to let the participants know what is coming up.



Slide O-19

1. Review what is covered in the Appendices.
2. Now take a moment for the participants to open their text books to the Appendices and explore them a little bit.



Overview and Introduction—Page 8

Unit 5—Inventory Control

In this unit the manager will learn:

- How to determine what supplies and equipment should be accounted for in an inventory control system
- How to determine how much supplies to keep in stock
- How to determine how to monitor the usage of supplies and equipment
- When it is best to use a computer for inventory control

Inventory Control

Managing Supplies & Equipment

- Determining what to manage
- Determining how much to stock
- Determining how to monitor use
- When to use a computer

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Unit 6—Contingency Planning

In this unit the manager will learn:

- How to conduct a vulnerability assessment
- How to prioritize action items from the vulnerability assessment into a mitigation plan
- How to develop an Emergency Response Plan

Contingency Planning

- Compiling a hazard summary
- Developing a vulnerability assessment
- Prioritizing mitigation actions
- Writing an Emergency Response Plan

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Appendices

At the end of the text are two Appendices of general reference material that will be used in the exercises during the course.

Appendices

Reference Material

- Manager's Handbook (Occupational Safety)
- Security Vulnerability Self-Assessment

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Instructor's Notes

Overview and Introduction—Page 9

Speaker Notes

Overview Review and Worksheet

1. Review what was covered in this Overview and Introduction Unit.
2. Review the key concepts and key terms from the first page of the Unit and see if anyone has questions about them.

Worksheet Answers

1. Who do you consider to be the “Water Utility Manager” in your village (give the person’s name and their actual job title, if their title is not Utility Manager)? _____

There is no “correct” answer for the purposes of this worksheet. The purpose of this question is to generate a discussion about who is considered a Utility Manager, and who is not.

2. True or **False**: The primary goal of this course is to teach the students to pass the State of Alaska Water Utility Manager Certification Exam.

At the time of the writing of this text, there no such thing as a Certified Utility Manager in the State of Alaska.

3. True or **False**: The pre and post self assessment tool will be used to determine whether you pass or fail this class.

The pre and post self assessment tools are to help determine what skills to concentrate on during the class.

4. True or **False**: If you fail this class, you cannot be considered a Utility Manager by the State of Alaska.
5. Match the list of management topics to the corresponding course in which they are taught.

Topic	Management Course
Payroll	Planning Management
Roles and Responsibilities	Organizational Management
Choosing the Best Alternative [Facility]	Personnel Management
Effective Communication with Employees	Operational Management
Operation and Maintenance Scheduling	Financial Management

6. True or **False**: One aspect of Operational Management means being able to mix chlorine up in the correct proportions for your water system.

Operational Management does not include knowing how to perform operational tasks, but it does include knowing that those operational tasks should be done.

7. True or **False**: You have to give this text book back at the end of the class.

The participants are encouraged to keep the textbook for future reference.

Overview and Introduction Page—9

Overview Review and Worksheet

The OVERVIEW AND INTRODUCTION section covered:

- Who should be considered a “Utility Manager”.
- How the DCED Utility Manager Training Program is structured, including descriptions of each course.
- How this course in the training program is structured, including descriptions of each topic.
- How the text book is structured.

Worksheet

1. Who do you consider to be the “Water Utility Manager” in your village (give the person’s name and their actual job title, if their title is not Utility Manager)? _____
2. True or False: The primary goal of this course is to teach the students to pass the State of Alaska Water Utility Manager Certification Exam.
3. True or False: The pre and post self assessment tool will be used to determine whether you pass or fail this class.
4. True or False: If you fail this class, you cannot be considered a Utility Manager by the State of Alaska.
5. Match the list of management topics to the corresponding course in which they are taught.

Topic	Management Course
Payroll	Planning Management
Roles and Responsibilities	Organizational Management
Choosing the Best Alternative [Facility]	Personnel Management
Effective Communication with Employees	Operational Management
Operation and Maintenance Scheduling	Financial Management

6. True or False: One aspect of Operational Management means being able to mix chlorine up in the correct proportions for your water system.
7. True or False: You have to give this text book back at the end of the class.

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Pre - Self Assessment

Instructor's Notes

Pre-Self Assessment—Page 1

Pre-Assess

Instructor class preparation

1. Ensure that all participants have their student manuals and have turned to the pre-self assessment page.
2. There is no practice “exercise” during the pre-self assessment, but there is a class discussion about the self-assessment followed by creation of a list of class expectations for the rest of the course. The should give the instructor an idea of what exercises to concentrate on during the class.

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Speaker Notes

Slide SA-1

1. Put up the slide SA-1 (which is the self assessment table from the pre-self assessment—Page 1) and explain how the self assessment works. Explain that:
 - There is no grade, it is not a test
 - It is a chance for honest reflection on what each participant believes about themselves
 - It might show that they already have many skills and didn't know it.
 - It might show they could learn a few more skills to help them manage their facility.
2. Explain the terms:
 - Not Knowledgeable
 - Somewhat Knowledgeable
 - Knowledgeable
 - Very Knowledgeable

And give examples like: For the skill “Ability to communicate with employees using MSDS”.

- If you have never heard of MSDS before then you are NOT KNOWLEDGEABLE.
 - If you have heard of MSDS before, and know that you can get information from OSHA, then you are SOMEWHAT KNOWLEDGEABLE.
 - If you have been at a worksite that used MSDS sheets before, and you flipped through the binder, but you didn't put the binder together yourself then you are KNOWLEDGEABLE.
 - If you have actually put together an MSDS binder before for a worksite, then you are VERY KNOWLEDGEABLE.
3. Explain that there is a page (table) for each Unit.
 4. Ask if there are any questions, if not then start.

There are Instructor Notes on Page SA-6 for the follow-up discussion after the self assessment and class expectations discussion.

Skill	Knowledge Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to communicate with employees using MSDS	1	2	3	4
Ability to communicate with employees using MSDS	1	2	3	4
Ability to communicate with employees using MSDS	1	2	3	4
Ability to communicate with employees using MSDS	1	2	3	4
Ability to communicate with employees using MSDS	1	2	3	4

PRE-SELF ASSESSMENT—PAGE 1

Instructions: The table that starts below and continues on for the next few pages, is the self assessment. Knowledge, skills, and abilities are listed in the left hand column. The knowledge, skills, and abilities are grouped by which unit they are covered in. The proficiency level is listed in the right four columns. Definitions for the proficiency levels are provided in the uppermost table on the page. Circle the number (1, 2, 3, or 4) to the right of the skill that is under the proficiency level that you think best describes your ability for that skill. For example, for the first skill under SAFETY, which is "Ability to write a safety policy for the utility;" If you do not know how to do this, or do not know where to get the information to do this, then circle the number "1" next to the right of that skill. If you know how to write a safety policy, and have actually written one before, then circle the number "4" to the right of that skill. Hint: If you circle any 4's, then you will get to teach that section to the other participants!

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

SAFETY

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to assess hazards in the workplace	1	2	3	4
Ability to mitigate hazards in the workplace	1	2	3	4
Ability to communicate hazards with employees using MSDS	1	2	3	4
Ability to determine what safety equipment and training are needed for the utility	1	2	3	4
Ability to write a safety policy for the utility	1	2	3	4

Pre-Assess

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PRE-SELF ASSESSMENT—PAGE 2

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

SCHEDULING WORK

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to develop a list of routine tasks that need to be accomplished daily, weekly, or monthly at the water treatment plant.	1	2	3	4
Ability to determine how much time is required to accomplish a list of routine tasks for the water treatment plant.	1	2	3	4
Ability to assign tasks to staff members and balance the workload.	1	2	3	4
Ability to fill out a work order for non-routine tasks.	1	2	3	4
Ability to schedule a work order and track it to completion of the work.	1	2	3	4

Pre-Assess

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PRE-SELF ASSESSMENT—PAGE 3

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

DATA COLLECTION AND REPORTING

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to determine what regulatory data needs to be collected.	1	2	3	4
Ability to determine what operating data needs to be collected.	1	2	3	4
Ability to make a form to collect operating data from the water treatment plant	1	2	3	4
Ability to compare operating data from previous readings to determine if water plant is operating normally.	1	2	3	4
Ability to prepare a monthly report to your council outlining the operation of the utility.	1	2	3	4

Pre-Assess

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PRE-SELF ASSESSMENT—PAGE 4

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

PUBLIC RELATIONS

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to write a consumer confidence report (CCR).	1	2	3	4
Ability to document and respond to customer complaints and suggestions.	1	2	3	4
Ability to inform the public about the utility.	1	2	3	4
Ability to involve the public in the utility.	1	2	3	4

Pre-Assess

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PRE-SELF ASSESSMENT—PAGE 5

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

INVENTORY CONTROL

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to determine what supplies to account for in an inventory control system.	1	2	3	4
Ability to catalog existing supplies either on paper or in a computer database system.	1	2	3	4
Ability to determine the appropriate amount of supplies to keep in stock.	1	2	3	4
Ability to use a paper or computer based system to monitor the use of supplies.	1	2	3	4
Ability to determine whether a computer should be used to track inventory.	1	2	3	4

Pre-Assess

Instructor's Notes

Pre-Self Assessment—Page 6

Speaker Notes

Pre-Assess

When everyone has completed the self assessment, then start the discussion

Pre-self assessment review

1. Start by asking what they thought of the self assessment in general.
 - Was it a useful tool?
 - Did they learn something about themselves?
2. Ask the class if they would like to review the self assessment page by page (Unit by Unit) or as a whole? Proceed with the review in the manner the class prefers.
3. For the review, don't review each particular skill, just ask the class if anyone rated themselves a "4" on any skill (for that page or the whole assessment). If someone says "yes", then ask them to share with the rest of the class an example of when they used this skill. The sharing of information between participants, especially their experiences using these skills, will probably be one of the most valuable pieces of this course.
4. If there were no "4's", then ask if there were any "3's". If there are any "yeses" then ask those to share their experiences about how they became knowledgeable about that skill. If there were 4's then skip the 3's and go on to the next bullet.
5. Ask if anyone rated themselves a "1" on any skills. Find out which skills the participants rated themselves "not knowledgeable", and determine how many people (a majority of the class?) rated themselves that for that skill. Ask the class if that particular skill is something that the class would like to learn more about during the course.

Class Expectations

1. Use the flip chart and start making a list of skills/topics to be sure to focus on during the rest of the course.
2. Explain that during the course, as they practice a skill or cover a topic in depth, they'll cross it off of the list.

PRE-SELF ASSESSMENT—PAGE 6

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

CONTINGENCY PLANNING

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to develop a list of hazards that can affect the utility.	1	2	3	4
Ability to list the component systems of the utility.	1	2	3	4
Ability to list the effects of disaster hazards on utility system components.	1	2	3	4
Ability to establish performance goals for the utility during an emergency.	1	2	3	4
Ability to determine what action items to include in a mitigation plan.	1	2	3	4
Ability to write an emergency response plan.	1	2	3	4

Pre-Assess

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Review Of Water Terms

Instructor's Notes

Review of Water Terms—Page 1

Speaker Notes

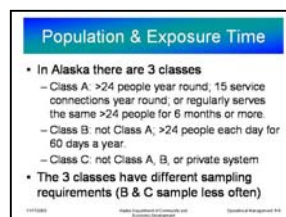
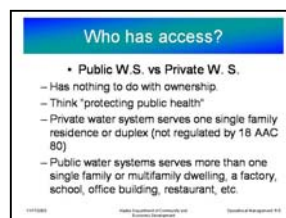
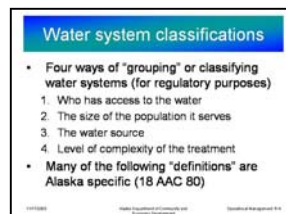
Water Terms

Water system classifications and terminology can be very confusing. Even engineers that design water systems have a hard time keeping it all straight. The terms on the next few pages are provided to help sort out all this mess.

This terminology refers mostly to REGULATORY definitions and different ways of classifying water systems.

Water systems can be grouped by:

- Who has access to the water (public or private)
- The amount of people it serves throughout the year (class A, B or C; or Small)
- The water source (ground water or surface water)
- And the type of water treatment required (Small Treated, Level I, Level II, Level III, Level IV)



References used to develop this Unit

- 18 AAC 80 - Drinking Water
- 18 AAC 74 - Water and Wastewater Operator Certification and Training
- A Plain English Guide to Alaska Drinking Water and Wastewater Regulations, State of Alaska Department of Community and Regional Affairs, Department of Environmental Conservation, September 1998

Review of Water Terms—Page 1

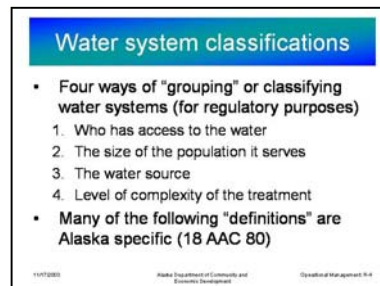
General Terms and Information about Water Systems and Operator Classifications

This section is provided as a reference for those who are new to the water industry and the regulations that govern it.

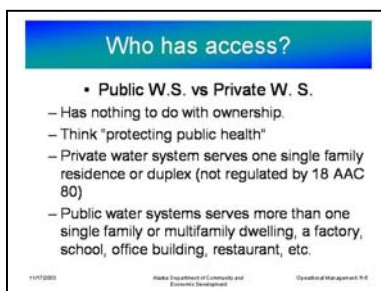
Water System Classifications

Not all water systems are the same, and there are different regulations that apply to different types or classifications of water systems. Water systems can be classified by who has access to the water, the amount of people that it serves, the water source, or the level of complexity of the treatment.

Understanding how water systems are classified will help you determine what regulations apply to your water system. The main regulation that applies to water systems in Alaska is Chapter 80 of the Alaska Administrative Code (18 AAC 80) which covers "Drinking Water". The requirements of 18 AAC 80 apply to the owner or operator of a "*public water system*". [Definitions for terms shown in *italics* are provided in this section.]



One would think that the difference between a *public water system* and a *private water system* is who owns the system. But the regulations are concerned with protecting public health; not who owns the systems. The regulations define public and private systems by who has access to the water. If the general public has access to the water, then think of it as a "*public water system*". The following are "legal" definitions, as they are paraphrased from 18 AAC 80.



Public Water System: (A) means a *potable water system* serving (i) one or more multi-family dwellings; (ii) a factory, office building, restaurant, school, or similar facility; or (iii) two or more duplexes or single-family residences; and (B) does not include a system serving one duplex or one single-family residence.

Private Water System: means a *potable water system* serving one single-family residence or duplex.

Public water systems are regulated by 18 AAC 80; *private water systems* are not regulated by 18 AAC 80.

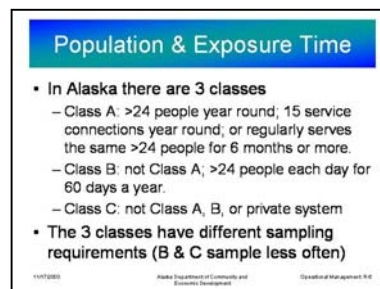
In Alaska *public water systems* are also categorized by "classes". The classes are defined as follows:

Class A public water system: means a *public water system* that (A) is expected to serve, year-round, at least 25 individuals, (B) is expected to serve, year-round, at least 15 residential service connections; or (C) regularly serves the same 25 or more individuals for at least six months of the year.

Class B public water system: means a *public water system* that is not a *Class A public water system*, and that regularly serves at least 25 individuals each day for at least 60 days of the year.

Class C public water system: means a *public water system* that is not a *Class A public water system*, a *Class B public water system*, or a *private water system*.

The biggest difference about how these three classes of water systems are regulated is that they have different water sampling requirements. In general the Class B and Class C systems have to sample fewer times making the water sampling and testing costs less expensive.



Instructor's Notes

Review of Water Terms—Page 2

Speaker Notes

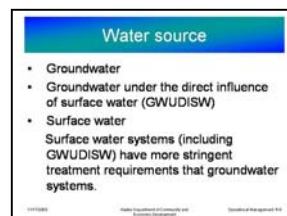
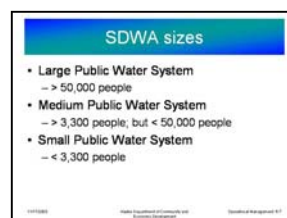
Water Terms

Water system classifications and terminology can be very confusing. Even engineers that design water systems have a hard time keeping it all straight. The terms on the next few pages are provided to help sort out all this mess.

This terminology refers mostly to REGULATORY definitions and different ways of classifying water systems.

Water systems can be grouped by:

- Who has access to the water (public or private)
- The amount of people it serves throughout the year (class A, B or C; or Small)
- The water source (ground water or surface water)
- And the type of water treatment required (Small Treated, Level I, Level II, Level III, Level IV)



Review of Water Terms—Page 2

You may also be exposed to terms like "*community water system*", "*non-community water system*", "*transient non-community water system*", and "*non-transient non-community water system*". These are terms that are used in the Safe Drinking Water Act (SDWA), which is a Federal Law, instead of Class A, Class B, or Class C, which are the terms used in the State Law. To avoid confusion, stick with the Class A, Class B and Class C terminology; but if you are curious, the definitions of the SDWA terminology are provided later in this unit. Water systems are also categorized by size.

Large Public Water System: means a *public water system* that serves more than 50,000 individuals.

Medium Public Water System: means a *public water system* that serves more than 3,300 and not more than 50,000 individuals.

Small Public Water System: means a *public water system* that serves 3,300 or fewer individuals.

SDWA sizes	
• Large Public Water System	→ > 50,000 people
• Medium Public Water System	→ > 3,300 people; but < 50,000 people
• Small Public Water System	→ < 3,300 people

Water Terms

When new regulations about water systems are enacted, it usually takes a while before they are implemented. A system is often set up where *large public water systems* are required to comply with the new regulations first, then *medium public water systems* at a later date (sometimes the following year), and finally *small public water systems*. In some cases, *small public water systems* may be exempt from a regulation, as in the case of water system vulnerability assessments required by the Homeland Community Act, which only apply to *large* and *medium size water systems*.

These size categories are from the SDWA and are applied nationally. They don't make much sense for Alaska since there is only one water system in the state that is considered a large system, and 27 that are considered medium. The rest of the water systems in the state are considered small by this SDWA definition. Remember this usually affects when regulations get implemented for systems.

Where water systems get the water from is very important. Some water sources are protected very well, and need little treatment to remove or inactivate pathogens. Other water sources are potentially exposed to pathogens, and therefore require treatment before the water is considered fit for human consumption. The two broad categories of water source are *groundwater* and *surface water*.

Groundwater: means water beneath the surface of the ground; groundwater does not include *GWUDISW*.

Groundwater Under the Direct Influence of Surface Water or GWUDISW: means water beneath the surface of the ground with (A) a significant occurrence of (i) insects or other macroorganisms; (ii) algae; or (iii) microorganisms, including *Cryptosporidium parvum* and *Giardia lamblia*; or (B) significantly and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH that closely correlate to climatological or surface water conditions.

Water source	
• Groundwater	
• Groundwater under the direct influence of surface water (GWUDISW)	
• Surface water	
Surface water systems (including GWUDISW) have more stringent treatment requirements than groundwater systems.	

Groundwater system: means a *public water system* that uses only *groundwater* as the source water.

Surface water: means water that is open to the atmosphere and subject to surface runoff.

Surface water system: means a *public water system* that uses only *surface water* for a source.

Surface water systems (including systems that use *GWUDISW*) have more stringent treatment requirements than *groundwater systems*.

Instructor's Notes

Review of Water Terms—Page 3

Speaker Notes

Water Terms

Water system classifications and terminology can be very confusing. Even engineers that design water systems have a hard time keeping it all straight. The terms on the next few pages are provided to help sort out all this mess.

This terminology refers mostly to REGULATORY definitions and different ways of classifying water systems.

Water systems can be grouped by:

- Who has access to the water (public or private)
- The amount of people it serves throughout the year (class A, B or C; or Small)
- The water source (ground water or surface water)
- And the type of water treatment required (Small Treated, Level I, Level II, Level III, Level IV)



Review of Water Terms— Page 3

Water and Wastewater Operator Classifications

As of January 2001, all *Class A public water systems* in Alaska must be actively supervised by a certified *operator*. Chapter 74 of the Alaska Administrative Code (18 AAC 74) outlines the requirements for water and wastewater operator certification and training. Water and wastewater systems are classified by their complexity and the level of expertise required to operate the systems. The state offers 5 levels of certification for operators in each of 4 areas of the water or wastewater field. Operators can be certified in *Water Treatment*, *Water Distribution*, *Wastewater Collection* or *Wastewater Treatment*. The 5 levels of certification start with an Operator-In-Training (OIT), and then progress from a Level I up to a Level IV. Each level of certification requires additional experience, education and or training.

Treatment Complexity	
Operator Certification Levels	
• Small Untreated (serves pop. >500)	
• Small Treated (serves pop. > 500)	
• (Operator in Training)	
• Level 1	
• Level 2	
• Level 3	
• Level 4	

Operator: means a person engaged in the operation of a water supply or wastewater system; "operator" does not ordinarily mean an official, such as the city engineer or public works superintendent, exercising only general administrative duties.

Water Treatment System: means devices, structures, and equipment used to condition, purify, or refine water for *human consumption*, and does not include a *groundwater* supply treated only with chlorine.

Water Distribution System: means post treatment storage facilities, conduits, mains, lines, pumping stations, or other devices used to carry water to the consumer, and includes a *groundwater* supply treated only with chlorine.

Wastewater Collection System: means pipelines or conduits, pumping stations and force mains, and all other related constructions, devices, and appliances used to conduct wastewater to a wastewater treatment system.

Wastewater Treatment System: means devices, structures, and equipment used to treat, neutralize stabilize or dispose of wastewater and residuals.

Prior to January 2001, water and wastewater systems that served fewer than 100 service connections or 500 people were not required to be supervised by a certified operator. In January 2001, 18 AAC 74 was amended to comply with the SDWA and water systems serving fewer than 100 service connections or 500 people were required to be supervised by a certified operator (this does not apply to wastewater systems). Two new certification levels were established for these "small" systems. These levels are *small untreated water system*, and *small treated water system*. To become certified at these levels, operators are usually tested on-site at their own treatment facility, and the certification is not transferrable to another facility (the operator is only certified for that one small facility).

For *Class A public water systems* with fewer than 100 service connections that are used by fewer than 500 individuals per day, and *Class B public water systems* that use a surface water source or GWUDISW, then the following definitions apply:

Small Untreated Water System: does not add chemicals to the water.

Small Treated Water System: adds chemicals to the water.

Don't confuse the *small untreated* and *small treated water systems* with the *small public water system* shown above under water system classifications. *Small treated* or *small untreated water systems* are special Alaska specific designations for operator certification levels. The *small public water system* is a national definition that has to do with the timing of when regulations get implemented.

In summary, all *public water systems* except *Class B public water systems* that use *groundwater* and *Class C public water systems* require supervision by a certified operator.

Instructor's Notes

Review of Water Terms—Page 4

Speaker Notes

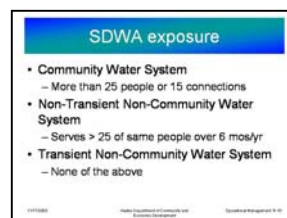
Water Terms

Water system classifications and terminology can be very confusing. Even engineers that design water systems have a hard time keeping it all straight. The terms on the next few pages are provided to help sort out all this mess.

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Water systems can be grouped by:

- Who has access to the water (public or private)
- The amount of people it serves throughout the year (class A, B or C; or Small)
- The water source (ground water or surface water)
- And the type of water treatment required (Small Treated, Level I, Level II, Level III, Level IV)



Review of Water Terms—Page 4

Water System Terminology and Definitions

The following are "legal" definitions, as they are paraphrased from Chapter 80 of the Alaska Administrative Code (18 AAC 80) which covers "Drinking Water". The requirements of 18 AAC 80 apply to the owner or operator of a "public water system".

Human Consumption: means the use of water for drinking, bathing, showering, cooking, dish washing, maintaining oral hygiene, and other similar uses.

Drinking Water: means water that is provided for *human consumption*.

Potable Water System: means a source of water, intake works, collection system, water treatment works, storage facility, or distribution system from which water is available for *human consumption*.

Terms used by SDWA, but defined in 18 AAC 80:

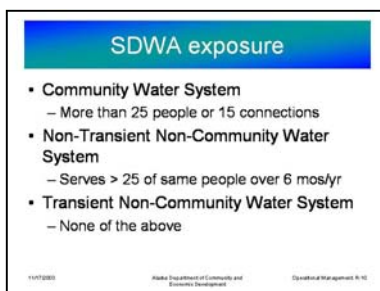
Community Water System: means a *Class A public water system* that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents [Definitions (A) and (B) of a *Class A public water system*].

Non-Community Water System: means a *non-transient non-community water system* or a *transient non-community water system*.

Non-Transient Non-Community Water System: means a *Class A public water system* that is not a *community water system* and that regularly serves at least 25 of the same individuals over six months per year [Definition (C) of a *Class A public water system*].

Transient Non-Community Water System: means a non-community water system that does not regularly serve at least 25 of the same individuals over six months per year. [This includes *Class B public water systems* and *Class C public water systems*]

The SDWA terminology does not distinguish between Alaska's Class B and Class C water systems.



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Unit 1

Safety

Safety

Instructor's Notes

Safety—Page 1

Instructor class preparation

1. There are two exercises in this Unit. Make sure you are familiar with the exercises. The first exercise has three possible scenarios. You may want to let the class choose which one they want to do. In that case you should be prepared to do any one of the three scenarios.
2. The heart of this Unit is how to conduct a hazard assessment. This is the part that you will probably want to spend most of your time, as the rest of the Unit (except the safety policy development) is based on the results of the hazard assessment.
3. You should probably have a copy of the suggested reference "The Manager's Handbook" for everyone in the class if possible.

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Safety

Lesson Length: 4 hours

Schedule:

- | | |
|----------------------------------|---------|
| • Hazard assessments | 30 min. |
| • Exercise 1-1 Hazard Assessment | 90 min. |
| • Hazard communication | 15 min. |
| • Exercise 1-2 MSDS | 45 min. |
| • Safety policy | 15 min. |
| • Review/Worksheet/Action plan | 45 min. |

Helpful References to have on hand

- *The Manager's Handbook: A Reference for Developing a Basic Occupational Safety and Health Program for Small Businesses*, Rev 4/2000; State of Alaska, Dept. of Labor & Workforce Development

Speaker Notes

Slide 1-1

1. Review the schedule for this Unit (adjust schedule if needed based on the results of the self assessment).
2. Review the **Learning Objective** and the **Key Concepts to Learn** for the Unit.
3. Confirm which topics to focus the most attention on based on the class expectations.



Safety—Page 1

Learning Objectives

After completing this Unit you should understand your role in providing a safe work environment for your employees.

Key Concepts to Learn

This Unit discusses the importance of making safety a “management” priority, and provides ways that management can contribute to providing a safe work environment, namely:

- How to conduct a hazard assessment
- How to mitigate hazards
- How to communicate hazards to employees
- How to write a safety policy

Safety

The Utility Manager's role in providing a safe work environment

- Getting all staff involved in safety
- Hazard assessments
- Hazard mitigation
- Hazard communication
- Safety policy

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Operational Management 1-1

Safety

Key Terms to Know

- OSHA
- Hazard assessment
- Mitigation
- MSDS

Key to a Successful Safety Program

“Although the physical safeguarding of the place of employment is a very real factor in occupational safety and health, the **mental attitude** of the employee is the ultimate key to avoiding accidents.”

The Manager's Handbook, State of Alaska
Dept. of Labor & Workforce Development

References used to develop this Unit

- 29 CFR Part 1910 Occupational Safety and Health Guidelines
- Chemical Hazard Communication, OSHA publication 3084, 1998 (revised)
- Handbook for Small Business, OSHA publication 2209, 1996 (revised)
- Keeping Your Workplace Safe, Q's & A's for Small Business Employer, OSHA brochure 98-40
- Let's Talk Safety, 2003 Safety Talks: A Series of 52 Talks on Common Utility Safety Practices, American Water Works Association, 2003
- The Manager's Handbook, A Reference for Developing a Basic Occupational Safety and Health Program for Small Businesses, Rev 4/2000; State of Alaska, Department of Labor & Workforce Development, Division of Labor Standards and Safety, Occupational Safety and Health.
- Public Law 91-596, Occupational Safety and Health Act of 1970

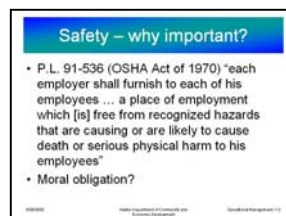
Instructor's Notes

Safety—Page 2

Speaker Notes

Slide 1-2

1. Discuss why safety is important. You may want to ask the question, “Why is safety important?”.
2. Wrap up that discussion by making sure that the participants know that it is the law to provide a safe work environment (but that that is not the only reason to provide a safe work environment). Other reasons may include:
 - Moral obligation?
 - Moral of employees (that they know that their employer is concerned about their safety)
 - Save money
 - Other reasons?
3. Explain that the best way to have a safe work environment is to get all the employees involved, and have everyone agree with the concept. Discuss ways to get staff involved.



Slide 1-3

1. Explain that there are 5 easy steps that a manager can take to start providing a safe work environment. (The steps are listed on the slide and in the text).
2. Each of these steps will be covered in detail.



Safety—Page 2

This lesson is about how to provide a safe work environment for your employees which will help to ensure a safe and healthy water supply for the community.

Safety

As a water utility manager, you have a responsibility to provide a safe work environment for your employees. This is not just a moral responsibility; it is also the law. Public Law 91-596, the Federal Occupational Safety and Health Act of 1970 says among other things that "...each employer shall furnish to each of his employees ... a place of employment which [is] free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees...". You may not be the employer. Maybe it is the City or the Tribal Council, but if you are the supervisor, you still have a responsibility.

Safety – why important?

- P.L. 91-536 (OSHA Act of 1970) "each employer shall furnish to each of his employees ... a place of employment which [is] free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees"
- Moral obligation?

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Alaska Department of Community and Economic Development

Operational Management 1-2

Safety

The key to having a safe work environment is to have a commitment from management (which may be you!) and getting employees involved in the process.

What do you need to do to ensure a safe work environment?

The Occupational Health and Safety Administration (OSHA) requires you to do several things, namely:

- Assess the hazards in your workplace
- Mitigate any hazards possible
- Make your employees aware of these hazards (includes MSDS)
- Provide safety equipment and training for employees
- Have a written safety policy and program including emergency evacuation plan and fire safety plan (this topic covered in the Personnel Management Class)

Ensuring a Safe Environment

- Assess the hazards in your workplace
- Mitigate any hazards possible
- Make your employees aware of these hazards (includes MSDS)
- Provide safety equipment and training for employees
- Have a written safety policy and program including emergency evacuation plan and fire safety plan

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Operational Management 1-3

Instructor's Notes

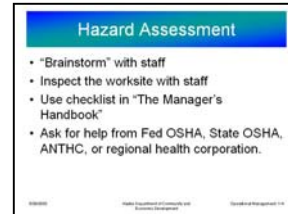
Safety—Page 3

Speaker Notes

Safety

Slide 1-4

1. Ask if anyone can describe what a hazard assessment is. If know one knows then explain what it is and why it is important.
2. Discuss ways to do a hazard assessment. Emphasize that it should not be done alone, get as many people involved as you can.
3. Pass out copies of the “Manager’s Handbook”, and flip through the hazard assessment worksheets in the back.
4. Discuss who they can call on for more assistance with conducting a hazard assessment.



Slide 1-5

1. Discuss what some of the most common hazards and injuries are in water treatment plants.
2. Ask if the participants can name other common injuries.



Exercise 1-1 Hazard Assessment

This exercise is about how to go about conducting a hazard assessment. Give the participants a choice of conducting a hazard assessment for one of the following scenarios.

1. The facility where the class is being held (either the hotel conference room, tribal center, city office, or where ever this training is being conducted).
2. A fictional water treatment plant that is described in Section C Exercise 1-1.
3. Their own water treatment plant based on what they remember about the facility.

Make copies of the worksheet from the back of the Manager’s Handbook for the participants to use in performing their hazard assessment.

Instruct the participants to mark through items or sections of the worksheet that do not apply.

When all the items on the worksheet have been checked and either categorized or marked through, ask the participants to prioritize the items, picking the ones that are critical that need attention immediately, and noting which ones can be put off until later.

Discuss how the participants would go about addressing the concerns that they noted.

Safety—Page 3

Hazard Assessment

What is a hazard assessment?

A hazard assessment is when you and your employees analyze all the worksite conditions to identify and eliminate existing or potential hazards.

Why is this important? You may say to yourself, “no one has ever been injured here before, so everything must be OK, right?” Wrong! The person who is doing the job right now may unconsciously understand what hazards exist, and avoid them intuitively, but the next person that comes along may not know that there is a hazard. That is why it is important to list what hazards exist, so that you can inform your employees (especially new ones) and they can avoid the hazards.

How do you assess the hazards in your workplace?

There are many ways to go about assessing the hazards in your workplace. First, do not try doing this alone. This should be a group activity with your employees. They are more familiar with their own work environments than you are. Their input will be very valuable, and they will be more likely to follow any safety policies and procedures that are established if they have contributed to the development of them. To develop the hazard assessment try:

- Having a “brainstorming” session with your employees;
- Walk through the worksite with them;
- Use the checklist provided in the back of “The Manager’s Handbook, A Reference for Developing a Basic Occupational Safety and Health Program for Small Businesses” published by the Alaska Department of Labor;
- Ask for professional help from either the Alaska Division of Occupational Safety and Health; the federal OSHA; the Alaska Native Tribal Health Consortium; or your local native regional health corporation.

Hazard Assessment

- “Brainstorm” with staff
- Inspect the worksite with staff
- Use checklist in “The Manager’s Handbook”
- Ask for help from Fed OSHA, State OSHA, ANTHC, or regional health corporation.

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Operational Management: 1-4

What are some of the most common hazards and injuries in water treatment plants?

- Falling hazards (off of ladders, water storage tanks, slick floors)
- Lifting hazards (back injuries)
- Electrical shocks (water and electricity do not mix well)
- Confined spaces (inside water tanks, manholes, lift stations, valve vaults)
- Trench cave-ins (repairing water lines and service connections)
- Burns (fuel or hot water/glycol)

Common Hazards

- Falling hazards
- Lifting hazards
- Electrical shocks
- Confined spaces
- Trench cave-ins
- Burns

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Alaska Department of Community and Economic Development
Operational Management: 1-5

Instructor's Notes

Safety—Page 4

Helpful References to have on hand:

- **Let's Talk Safety, 2003 Safety Talks: A Series of 52 Talks on Common Utility Safety Practices**, American Water Works Association, 2003

Speaker Notes

Safety

Slide 1-6

Mitigation

1. Ask if anyone knows what “mitigation” means. Mitigation means “to make less severe” - so mitigation is a corrective action that may not eliminate a hazard, but it lessens the severity of the danger.
2. Ask if the participants can name common mitigation activities:
 - Exit signs and emergency lights
 - Fire extinguishers and sprinklers
 - Smoke detectors
 - Physical relocation of equipment
 - Elimination of confined spaces



Communication

1. Explain that we'll discuss staff meetings and their importance during the Unit on Public Relations, but that they should incorporate a short discussion on safety into their regular staff meetings. (refer to the Staff Meeting form in Appendix 4).
2. A sample MSDS sheet on Calcium hypochlorite is provided in Section C—Exercises. Do exercise 1-2 to review MSDS sheets, where to get them, what to do with them, and what information they contain.

Safety Equipment and Training

Notes are on page 1-5

Safety—Page 4

Mitigating hazards

What does mitigating hazards mean? Mitigating hazards means changing conditions in the workplace so that the hazards are minimized or eliminated.

How do you mitigate hazards? Once you have identified hazards, what do you do about them? If it is possible to eliminate them, do it! The best way to prevent injuries is to eliminate the thing that causes the injury. For example, what if the water treatment plant operator had to climb a short ladder every day to read a water meter in the water plant because the water meter was on a pipe overhead. Climbing the ladder everyday is a hazard, because the operator could fall off the ladder and be injured. Can this hazard be mitigated? Probably. First, does the meter have to be read everyday? Maybe the meter only needs to be read once a month. This reduces the number of times the operator is exposed to the hazard. If the meter does have to be read everyday, then maybe it can be relocated to a more convenient location at eye level, or a remote readout for the dial can be located at eye level. If it cannot be relocated, then maybe a permanent set of steps with a railing can be constructed for the operator to stand on.

Safe Environment, cont.

- **Mitigate hazards**
 - try to minimize employee exposure to hazards
- **Communicate hazards to employees**
 - Safety meetings (part of regular staff meeting)
 - MSDS
- **Provide safety equipment and training**

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Operational Management: 1.6

Safety

There can be many ways to mitigate a hazard. You and your employees will have to choose which solution is most appropriate for your situation.

Communication with Employees

What does communicating hazards to my employees mean? Once you have developed the list of potential hazards in your workplace, you must inform all of your employees about what hazards exist in the workplace.

How do I communicate the hazards to my employees? You should review the hazard assessment list with all of your employees so that they are aware of what hazards you have identified in the workplace. Once you have reviewed the entire hazard assessment with your employees, you should follow up with regular safety meetings. These meetings do not have to be long, in fact they should be short and to the point, emphasizing one particular subject so that your employees are likely to remember what was discussed. One OSHA requirement is that you communicate to your employees what hazardous materials exist in the workplace that they may come in contact with. One of the most effective way to communicate these hazards is by maintaining a binder of data sheets on the hazardous materials and making the binder available to your employees. These data sheets are called Material Safety Data Sheets (MSDS). You may have heard of MSDS before. One of the topics you should cover in your safety meetings should be MSDS, where the binder can be located, and where the hazardous materials listed in the MSDS are located.



Instructor's Notes

Safety—Page 5

Speaker Notes

Slide 1-6 Continued

Safety Equipment and Training

1. Review the importance of equipment and training (it is a form of mitigation)
2. Review how to go about determining what equipment and training are needed.
 - Refer to the hazard assessment for list of hazards
 - Refer to mitigation plan for a list of hazards you think need can be mitigated with equipment or training.
3. Discuss where and how managers can get safety equipment.
 - Can purchase it themselves using their own funds
 - Can be purchase as part of a sanitation construction project funded by ANTHC or VSW.
4. Discuss where managers can get training for their staff.
 - Regional Tribal Health Corporations sponsor training
 - ANTHC
 - ADEC
 - ADOL&WD/OSHA
 - AWWMA



Slide 1-7

1. Discuss the importance of having a safety policy
 - that it is to emphasize management's commitment for ensuring a safe work environment for the employees.
 - Orients new employees (staff and managers)
2. Discuss how to go about writing a safety policy. Emphasize getting the whole staff involved in developing the policy.



Safety—Page 5

Safety Equipment and Training

Why is safety equipment and training important? Some hazards cannot be entirely eliminated. For example, most water treatment plant operators handle calcium hypochlorite on a regular basis. Since this task cannot practically be eliminated, the risk to the operator should be minimized. Protective clothing (gloves, apron, goggles) and training in handling calcium hypochlorite should be provided.

How do I know what equipment and training are needed? When you perform your hazard assessment, you will notice items that cannot be physically eliminated. You may determine that the best way to mitigate these hazards is to provide your employees with special equipment or training to handle the hazard. For example, many water treatment plants have electrical control panels that turn the pumps on and off. Occasionally a fuse or relay will burn out and will need to be replaced. The operator will have to open the panel, locate the burned out fuse, remove it and replace it with a new one. This is a relatively simple task, but there is a hazard that the operator will be electrocuted if he does not take proper precautions. The operator should receive the proper training to know how to isolate and lock out the electric panel from live electricity. Also, ask your employees what training they think they need.

Safety

Written Safety Policy

What is a written safety policy? A written safety policy states the organization's commitment to providing a safe work environment for their employees and outlines the roles and responsibilities of the organization and employees (yes each employee has responsibilities).

Why is a written safety policy important? A written safety policy preserves institutional memory for the best safety procedures in given circumstances and better prepares new employees. A written safety policy also establishes the commitment of the organization to the safety of the employees. When the policy is written with input from the employees, then they also have ownership of the policy and are more likely to follow the procedures.



How do you write a safety policy? Again, do not try and do this alone. Get your employees involved. A safety policy should contain the following elements:

- Duties and responsibilities of the safety officer and staff
- Safety rules and guidelines for specific situations
- Emergency evacuation plan*
- Hazard communication plan*

*elements required by law.

(Safety policies are also covered in the Personnel Management Class)

Instructor's Notes

Safety—Page 6

Speaker Notes

Sample Safety Policy

The next five pages show an example of a safety policy. The instructor will have to determine how much of the detail of the sample safety policy to cover based on how much time is available for this unit and class interest level in this subject matter.

This policy contains the key elements that a safety policy should have. It states:

- The management's commitment to safety
- The management's commitment to getting the staff involved in safety
- Duties and responsibilities

The plan also provides some details for:

- Hazard Communication
- Emergency Evacuation Plan
- Fire Safety Plan

Elements of this plan can be deleted or added to as they apply to the particular Utility. If there is only a Manager and an Operator employed by the Utility, then the Safety Committee will be pretty small. The policy can be much shorter and more general in nature, or longer and more detailed.

Emphasize that the plan should be reviewed and updated/revised at least annually. Once it is written, the safety plan is not complete, it has only started. It will evolve as the Utility evolves.



Safety—Page 6

Sample Safety Policy

Rocky Point Water & Sewer Utility Occupational Health & Safety Policy

It is the policy of the Rocky Point Water and Sewer Utility (Utility) to protect the safety and health of our employees. Injury and illness losses from workplace hazards are needless, costly and preventable. The Utility has established a safety and health program adapted to fundamental occupational safety and health concepts that will help us prevent injury and illness due to hazards. The Utility Manager will allocate resources in the Utility budget for employee training and personnel protective equipment to help prevent injury and illness due to hazards at the utility.

Staff involvement is critical for the Utility to be successful in this effort. To accomplish this task, safety and health responsibilities will be assigned to staff, and staff will be held accountable for their responsibilities. All unsafe conditions shall be reported immediately to their supervisor and action shall be taken to correct the problem.

Definitions:

1. Utility: The Rocky Point Water and Sewer Utility. An organizational unit within the Village of Rocky Point that is responsible for an independent budget.
2. Utility Manager: The individual the is responsible for managing the budget for the Utility.
3. Staff: Meaning all Utility personnel under the supervision of the Utility Manager.

Responsibilities:

1. Utility Manager: The Utility Manager shall ensure that the Utility Occupational Safety and Health Policy is distributed to all Utility staff members and implemented into the normal routine of the workplace. The Utility Manager shall also ensure that resources for essential safety equipment and staff training are allocated in the Utility budget. The Utility Manager shall appoint a staff member as Safety Officer and determine a length of time for the staff member to serve as Safety Officer.
2. Staff: The staff members are responsible for reading, understanding, and implementing the Utility Occupational Safety and Health Policy. Staff members may serve as Safety Officer, perform safety related tasks scheduled by the Safety Officer, or serve on the Safety Committee.
3. Safety Officer: The position of Safety Officer may rotate through the staff, each serving for a period of time to be determined by the Utility Manager. The Safety Officer will coordinate safety activities for Utility by scheduling essential tasks, recruiting staff members to perform the tasks and documenting that the tasks have been completed. The Safety Officer may call for a Safety Committee meeting to discuss safety policies and procedures to recommend to the Utility Manager and the Utility staff. Tasks that the Safety Officer shall schedule include:
 - a. Safety discussions at staff meetings
 - b. Hazard assessment or hazard assessment review (including workplace hazardous chemicals)
 - c. MSDS update
 - d. Emergency Action and Fire Safety Plans Update
 - e. Maintain staff training records
 - f. Policy review and revision
5. Safety Committee: A Safety Committee shall be composed of interested staff members recruited by the Safety Officer or Utility Manager. The Safety Committee will meet when called by the Safety Officer or Utility Manager to discuss safety policy and procedures, and make recommendations regarding changes to the policy or procedures to the Utility Manager and staff.

Instructor's Notes**Safety—Page 7****Speaker Notes****Safety**

**This section is intentionally blank.
See Safety - Page 6 for Speaker
notes.**

Safety—Page 7

Sample Safety Policy continued

Safety Discussions at Staff Meetings

The Safety Officer shall schedule time for safety discussions during the regularly scheduled weekly staff meetings. The time for safety discussions shall occur on a regular interval, but does not have to occur at every weekly staff meeting. Topics that may be covered during a safety discussion include, but are not limited to:

- a. status of safety program
- b. safety tasks that are to be scheduled
- c. recruitment of volunteers to perform tasks
- d. status of safety equipment
- e. upcoming training opportunities
- f. hazard communication

Hazard Assessment

The Safety Officer shall schedule an annual hazard assessment or hazard assessment review of the Utility work environment. The Utility work environment includes, but is not limited to the Village Council office environment, the washeteria/water treatment plant and related facilities, the transportation environment (delivering water to homes). The hazard assessment shall be performed by physical inspection of the work environment and/or open discussion among the Utility staff. All identified hazards shall be addressed in the Utility Occupational Safety and Health Policy. The hazard assessment shall include identification of substances that require MSDS.

Emergency Action and Fire Safety Plan

The Safety Officer shall maintain and schedule the update of the Emergency Action and Fire Safety Plan as needed (e.g. when there is a new Utility facility, when there has been a change in staff, etc.) The Utility staff shall practice the steps of the Emergency Evacuation Plan once per year.

Hazard Communication

Under the provisions of the OSHA Hazard Communication Standard, Employers are responsible for informing employees of the hazards and the identities of workplace chemicals (and in Alaska, physical agents) to which they are exposed. The following steps shall be taken as the hazard communication program for the Utility.

1. The Safety Officer shall recruit a staff member to identify and list hazardous chemicals in the Utility workplace.
2. The Safety Officer shall recruit a staff member to obtain MSDSs and labels for each hazardous chemical, if not provided by the manufacturer, importer, or distributor.
3. The Safety Officer shall have the MSDSs for all hazardous chemicals and physical agents combined into a binder labelled "MSDS - Workplace Hazardous Chemical Information".
4. The Safety Officer shall ensure that all hazardous chemicals in the workplace are properly labeled.
5. The Safety Officer shall schedule a hazard communication discussion and ensure that all Utility staff are aware of what hazardous chemicals are in the workplace, where they are located and the location of Hazardous Chemicals Information Binder.

Staff Training

The Safety Officer shall determine what safety related training is required for all staff to receive. The Safety Officer shall locate opportunities for the staff to receive the required training and inform the staff. The Safety Officer shall inform the Utility Manager on the budget implications for the required training. The Safety Officer shall maintain a record of staff training.

Staff may attend non-required safety related training if the Utility budget allows.

Instructor's Notes**Safety—Page 8****Speaker Notes****Safety**

**This section is intentionally blank.
See Safety - Page 6 for Speaker
notes.**

Safety—Page 8

Sample Safety Policy continued

Occupational Injury/Illness Investigation and Reporting

All injuries and illnesses - even minor ones - must be investigated by the staff member's immediate supervisor. The goal of the investigation is to find out what happened so that measures can be taken to prevent reoccurrence.

General Safety Rules

The Utility staff has compiled a list of safety concerns. These concerns have been grouped into three broad categories: Office, Plant and Outdoors. These general safety rules attempt to address these concerns.

Office:

- 1) Security: The Utility office doors shall be locked when:
 - a) There is no staff member on duty in the office (e.g. everyone is travelling, or at lunch)
 - b) When a Utility staff member is in the office before or after normal office hours or on weekends.
- 2) External building safety:
 - a) Utility staff shall report icy/slippery sidewalk conditions to the Safety Officer. The Safety Officer shall contact the building management to have the icy conditions addressed.
- 3) Internal building safety:
 - a) No office furniture or items shall be placed in such a way that they block or partially block egress from the any of the Utility offices.
 - b) Utility staff members wishing to retrieve an item off of a high shelf that can not reach the shelf while standing on the floor, shall ask for assistance from a staff member that can reach the shelf, or shall use an approved step ladder. Under no circumstances shall staff stand on other office furniture.
- 4) Ergonomics/repetitive motion:
 - a) The Safety Officer shall make arrangements for every work station to be inspected for ergonomic safety.
 - b) The Safety Officer shall make recommendations to the Utility Manager on office furniture changes/ purchases that are required to improve the ergonomic safety in the office.
- 5) Medical emergencies:
 - a) First-Aid Kit: The Utility does not maintain a comprehensive first-aid kit. The clinic, adjacent to the washeteria, and the VPSO office, adjacent to the Utility office both maintain comprehensive first-aid supplies. [There is a small first-aid kit that has a face shield for assisted breathing and some gauze to help control bleeding located in the water treatment plant]
 - b) If anyone has a medical emergency while in the office, the Acting Safety Officer shall stay with the "victim" and provide first-aid if appropriate (or designate someone to provide first-aid if appropriate). The Acting Safety Officer shall designate a staff member to phone the clinic or the on-call health aide.
- 6) Cold weather, travel to office: During extreme cold weather (colder than -20 F), no Utility staff shall leave home travelling to the office, or leave the office travelling home without emergency warm clothes in their vehicle (parka or sleeping bag) in case the vehicle breaks down.

Water Plant:

- 1) Clothing: Appropriate clothing for the job being performed will be worn while working in the at the plant or outdoors.
- 2) Water / Waste Water Treatment Plant & Construction Sites:
 - a) Any Utility staff working on electrical or mechanical systems shall use lockout-tagout procedures to ensure that the equipment is de-energized, and remains de-energized while work is under way.
 - b) Any Utility staff working in an area where they are likely to come into contact with waste water shall wear appropriate protective gear, such as rubber gloves, and eye shields.
 - c) No Utility staff member shall enter a confined space unless trained in confined space entry procedures and the confined space permit program is followed.
 - d) No Utility staff member shall climb a ladder higher than 15 ft without proper fall restraining

Instructor's Notes**Safety—Page 9****Speaker Notes****Safety**

**This section is intentionally blank.
See Safety - Page 6 for Speaker
notes.**

Safety—Page 9

Sample Safety Policy continued

- equipment.
- e) No Utility staff member shall operate heavy equipment with proper training.
- f) No Utility staff member shall enter a construction site without proper safety attire [hardhat, eye shield if needed]

Outdoors:

- 1) Travel within the village or between villages
 - a) Utility staff shall dress appropriately for the weather conditions when traveling by 4 wheeler, snow machine, boat, plane, car, dogsled, or other means.
 - b) Utility staff shall not travel on any vehicle if the vehicle operator is under the influence of alcohol or drugs.
 - c) BOATING: Utility staff shall ALWAYS wear a personal floatation device while traveling in a boat.

Emergency Action Plan

The purpose of this Plan is to outline duties and responsibilities of Utility staff during an emergency.

Definitions

Acting Safety Officer (Chain of Command): The Utility Manager shall be *Acting Safety Officer* in the event of an emergency. In the absence of the Manager, the position of Acting Safety Officer shall pass down to the next highest ranking staff member according to the chain of command as defined in the Utility Personnel Policy.

Safety Officer: As defined in the Utility Safety and Health Policy [The position of Safety Officer may rotate through the staff, each serving for a period of time to be determined by the Director. The Safety Officer will coordinate safety activities for the Utility by scheduling essential tasks, recruiting staff members to perform the tasks and documenting that the tasks have been completed...]

Emergency Action Plan: Utility Office Environment

Emergency Escape Procedures: In the event that the Utility staff need to evacuate the Utility offices or plant, staff shall follow these procedures:

- The *Acting Safety Officer* shall take note of the sign-in board and determine how many staff members are actually in the office.
- Utility staff shall evacuate the building following the posted fire escape routes and proceed to the nearest exit.
- After exiting the building, all staff shall assemble in the parking lot.
- Under no circumstances should any staff remain behind in the office (there is no critical plant equipment to operate).
- Once at the assembly area, the *Acting Safety Officer* shall account for all Utility staff.
- No staff members are assigned to perform rescue or medical duties.
- The *Acting Safety Officer* shall assign a staff member to contact the appropriate local authority to report the emergency.
- The *Acting Safety Office* shall assign a staff member to contact the Village of Rocky Point Administrator to inform them of the Utility office situation.

Situations that warrant evacuation: the following are examples of situations that may warrant the evacuation of the Utility offices or plant. Other unforeseen situations may also preclude the need for evacuation:

- Fire
- Large earthquake
- Power or heat outage
- Damaged plumbing
- Indoor air contamination (toxic spill)
- Intruder
- Bomb threat

Instructor's Notes**Safety—Page 10****Speaker Notes****Safety**

**This section is intentionally blank.
See Safety - Page 6 for Speaker
notes.**

Safety—Page 10

Sample Safety Policy continued

Employee Alarm: Utility staff shall follow the emergency evacuation procedures if the fire alarm is activated. If a staff member discovers a fire or other life threatening situation, they shall activate the building fire alarm. In the event that the fire alarm has not been activated, but an evacuation is still needed, the *Acting Safety Officer* shall notify staff to evacuate the offices by stating in a loud commanding voice "**Evacuate the offices now!!!**".

Training: Before implementing the Emergency Action Plan, the *Safety Officer* shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of staff.

Fire Prevention Plan

The Safety Officer shall insure that all smoke detectors and fire extinguishers are inspected on a regular basis and are in working order.

Housekeeping: Utility staff shall control accumulations of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency.

Training: The Safety Officer shall apprise Utility staff of the fire hazards of the materials and processes to which they are exposed.

Plan Review

The *Safety Officer* shall review this Emergency & Fire Safety Plan with all Utility staff, and ensure that all staff are familiar with their duties and the procedures of the plan at following times:

1. When the plan is developed
2. When there is a change in personnel and/or personnel responsibilities
3. When the plan is changed
4. Annually at a minimum

For further information, or clarification of this plan, contact:

1. Utility Manager: _____
2. Utility Safety Officer: _____

Instructor's Notes

Safety—Page 11

Speaker Notes

Safety Review and Worksheet

1. Review what was covered in this Unit on Safety.
2. Review the Key Concepts and Key Terms at the beginning of the Unit, and ask if there are any questions.
3. Begin work on the worksheet: The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion.

Worksheet Answers

1. True or **False**: A water system that does not use chlorine does not have to provide a hazard communication system (MSDS binder) in the water plant.

All employers have to have a hazard communication program, unless there are no hazardous materials in the work environment (since this water system does not use chlorine, then they do not need an MSDS for chlorine, but there are probably other things that they do need an MSDS for, like paint?)

2. Circle the letter of the best answer(s): The best way to provide a safe work environment is to:
 - a) Make all employees wear a hard hat and steel toed shoes.
 - b) Get all the employees involved in the safety program.**
 - c) Survey the work environment for hazards and reduce as many potential hazards as possible.**
 - d) Report all safety violations to OSHA.

These are the "correct" answers in the opinion of the author. Hard hats and steel toed shoes are important safety equipment, but are not necessarily the best way to provide a safe work environment (its OK if they circled it though). Getting all the employees to agree that safety is important is one of the most important things to do to ensure a safe work environment. Surveying the work site and reducing hazards (with the involvement of the staff) is a very active and important approach to ensuring a safe work environment. Reporting safety violations to OSHA may get management jumping to do something, but the effort will likely be short lived, since they will be reacting to a situation, rather than being proactive and preventing a situation. Reporting violations should be a last resort when all else fails.

3. True or **False**: A good way to implement a safety program is for the utility manager to draft up a policy by themselves, hand it out to all the employees, and tell them that if they do not follow the policy, they will be disciplined or fired.

This is almost as bad as reporting all violations to OSHA. Getting the staff involved in the process is a much better approach.

4. **True** or False: A safety policy should outline the responsibilities of management and of the staff.
5. True or **False**: Once a hazard assessment is performed, another one should not be needed for at least 10 years.

Hazard assessments and safety policies should be reviewed annually.

Action Plan

After doing the worksheet, complete the Action Plan for this Unit.

Safety—Page 11

Safety Review and Worksheet

This Unit was about the Utility Manager's Role in providing a safe work environment for the utility employees. Topics covered included: why safety is important, getting all the staff involved in the safety program, how to conduct a hazard assessment, how to mitigate hazards, how to communicate about hazards to employees, how to determine equipment and training needs, and how to write a safety policy.

Worksheet

1. True or False: A water system that does not use chlorine does not have to provide a hazard communication system (MSDS binder) in the water plant.
2. Circle the letter of the best answer(s): The best way to provide a safe work environment is to:
 - a) Make all employees wear a hard hat and steel toed shoes.
 - b) Get all the employees involved in the safety program.
 - c) Survey the work environment for hazards and reduce as many potential hazards as possible.
 - d) Report all safety violations to OSHA.
3. True or False: A good way to implement a safety program is for the utility manager to draft up a policy by themselves, hand it out to all the employees, and tell them that if they do not follow the policy, they will be disciplined or fired.
4. True or False: A safety policy should outline the responsibilities of management and of the staff.
5. True or False: Once a hazard assessment is performed, another one should not be needed for at least 10 years.

Action Plan

Write down at least one thing (and no more than three) that you learned this lesson (Safety) that could be done in your community.

1. _____

2. _____

3. _____

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Unit 2

Scheduling Work

Scheduling
Work

Instructor's Notes

Scheduling Work—Page 1

Instructor class preparation

1. There are three exercises in this Unit. Make sure you are familiar with the exercises before you begin.
2. The heart of this Unit is how to develop a task list. This is the part that you will probably want to spend most of your time and is probably one of the most useful skills a class participant can take back to their utility.

Lesson Length: 4 hours

Schedule:

- | | |
|--------------------------------------|--------|
| • Scheduling Work | 30 min |
| • Ex 2-1 Developing task lists | 60 min |
| • Ex 2-2 Schedule & Balance Workload | 60 min |
| • Work Order Discussion | 30 min |
| • Ex 2-3 Scheduling Work Orders | 30 min |
| • Unit Review/Worksheet/Action Plans | 30 min |

Materials Needed

General Materials:

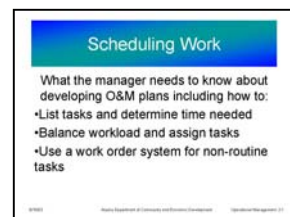
1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Scheduling Work

Speaker Notes

Slide 2-1

1. Review the schedule for this Unit (adjust schedule if needed based on the results of the self assessment).
2. Review the **Learning Objective** and the **Key Concepts to Learn** for the Unit.
3. Confirm which topics to focus the most attention on based on the class expectations.



Scheduling Work—Page 1

Learning Objectives

After completing this unit you should understand the manager's role in scheduling work, why it is important to have a written schedule of work, and how to go about scheduling routine and non-routine tasks.

Key Concepts to Learn

This unit discusses the importance of having a written work schedule, and provides ways to determine:

- What tasks go in the schedule
- How much time to allow for tasks
- How to balance the workload
- How to schedule and track routine and non-routine tasks.

Key Terms to Know

- Routine task
- Non-routine task
- Work order

Scheduling Work

What the manager needs to know about developing O&M plans including how to:

- List tasks and determine time needed
- Balance workload and assign tasks
- Use a work order system for non-routine tasks

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The image displays a sequence of seven overlapping calendar grids, each representing a month. The months, from top to bottom, are June, May, April, March, February, January, and December. Each grid is a 7x7 table where the first row contains the days of the week (S, M, T, W, Th, F, S) and the subsequent rows contain the dates. The grids are offset to the right and down by one row and one column for each successive month, creating a cascading effect. The December grid is the largest and is positioned at the bottom right, while the June grid is the smallest and is at the top left.

References used to develop this Unit

- Jordan, JK, Maintenance Management, American Water Works Association, 1990
- Preventive Maintenance Tasks for Tribal Drinking Water Systems, United States Environmental Protection Agency, Office of Water, EPA 816-F-01-017, June 2001
- Small Water System Operation and Maintenance, A Field Study Training Program, Second Edition, California Department of Health Services, Sanitary Engineering Branch, U.S. Environmental Protection Agency, Office of Drinking Water, 1990
- Utility Management, A Field Study Training Manual, 1st Edition, California State University, Sacramento, Office of Water Programs, 2001
- Water Distribution Operator Training Handbook, American Water Works Association, 1976
- Water Utility Management: AWWA Manual M5, American Water Works Association, 1999

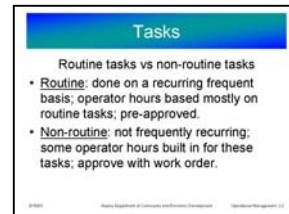
Instructor's Notes

Scheduling Work—Page 2

Speaker Notes

Slide 2-2

1. Discuss the difference between routine and non-routine tasks.
2. If you want, discuss the difference between “operations” and “maintenance”. This text does not make a significant distinction between the two; they both are made of tasks that have to be done to keep the facility running. Operations is sometimes seen as the “paperwork” end of the job, while “maintenance” is keeping the equipment going. Both are equally important, and in Alaska, many times one person does both jobs, so it is best to lump it all together into “operations and maintenance”.



Scheduling Work—Page 2

This unit covers skills associated with scheduling routine and non-routine tasks. The skills covered include:

- How to develop a schedule for routine tasks (operations and maintenance plan)
- How to develop and use a work order system for non-routine tasks

What are routine and non-routine tasks?

Routine tasks are those things that are done on a recurring frequent basis (e.g. daily, weekly or monthly). These tasks are sometimes broken down into either operations or maintenance. Operations are those tasks that are conducted on a routine basis to keep a facility running in the manner for which it was designed.

Operations include tasks like reading the water meters in the plant and testing for chlorine residual. Maintenance is those tasks that are done on a routine basis to keep equipment running. Maintenance includes tasks like cleaning the chlorine injector assembly and changing the fuel filter on the boiler. The terms operations and maintenance are often shortened to O&M. For the purposes of this course, do not worry about the difference in operations and maintenance. Just know that they both contain routine tasks that are conducted on a frequent recurring basis.

Non-routine tasks are those tasks that are done on a non-recurring, or unpredictable basis. Examples of non-routine tasks are hooking up a new water or sewer service connection, thawing a frozen water line, or replacing a broken water pump.

Routine Tasks

What is an operation and maintenance plan?

An operation and maintenance plan is setting down on paper a list of essential tasks that must be completed on a routine basis to keep the facility functioning correctly. The tasks are assigned a frequency based on how often they need to be done, and an estimated length of time to complete. The tasks are also assigned to a specific person to complete. This task list with frequency, length of time, and personnel responsibility becomes the operation and maintenance schedule or O&M plan.

Why is an operation and maintenance plan important?

Without a schedule or plan, staff will fill their workday without a specific direction or goal. Work will get completed on a “first come/first serve” approach. In other words, tasks will be worked after they are identified as needing to be done. This may not be the most efficient way to use the staff. Also, some not so obvious tasks may not ever be identified as needing to be done, if they are not written down. A written operation and maintenance plan helps the manager and the staff identify the tasks that need to be done on a frequent basis so that resources (staff, money, and materials) can be allocated to cover the tasks. Without a written operation and maintenance plan, the manager will not know how many hours an operator needs to properly run the water plant. A written operation and maintenance plan will also assist to orient new employees to their duties.

How do you make an operation and maintenance plan?

An operation and maintenance plan can be written several different ways, but the end result will be a list showing who is responsible for what task and the estimated frequency and length of time needed for each task. You will probably want to work with your water operator when putting together the operation and maintenance plan. You do not need to do this alone. Ask for help from RMWs, RUBAs, VSW or ANTHC staff. You may already have an O&M plan (or preventive maintenance plan, PM plan) that you can start with to modify. If you are starting from scratch, do it like this:

(continued on next page)

Tasks

Routine tasks vs non-routine tasks

- **Routine:** done on a recurring frequent basis; operator hours based mostly on routine tasks; pre-approved.
- **Non-routine:** not frequently recurring; some operator hours built in for these tasks; approve with work order.

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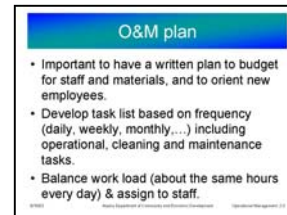
Instructor's Notes

Scheduling Work—Page 3

Speaker Notes

Slide 2-3

1. Discuss what an “operation and maintenance plan” (O&M plan) is:
 - Written plan
 - Identifies tasks to be done
 - Frequency of tasks (how often)
 - Time required for tasks
 - Who does tasks
2. Discuss why it is important to have an O&M plan:
 - Help manage and develop a budget by identifying how many operator hours are required
 - Helps provide direction, goals for work
 - Helps orient new employees and retain institutional memory
3. Discuss how to go about developing an O&M plan:
 - Start with old O&M plan or PM plan if one is available
 - If starting an O&M plan from scratch, use the method described on the opposite page, based on frequency of tasks (one sheet for DAILY, one sheet for WEEKLY, etc.)
4. Work on Exercise 2-1, Developing a Task List for the Muddy River Water & Sewer Utility.
5. Discuss how to balance the workload between people (staff) and hours of the day/days of the week, etc.
6. Work on Exercise 2-2 Scheduling and Balancing the workload.



Scheduling Work—Page 3

(continued from previous page)

Developing the list of tasks based on frequency: Start with 4 pieces of blank paper. Label one “DAILY”, one “WEEKLY”, one “MONTHLY”, and the last one “LESS FREQUENT”. As you think of tasks that need to be done, you will write them down on one of these sheets. After you have the list of tasks, you will have to determine how long it takes to do each task. Write down an estimated amount of time needed next to each task either in minutes or hours. This is where your operator will come in handy. He/she should have a good idea about how long it takes to do the tasks.

You will want to consult several different sources to ensure that the list of tasks you have made is as complete as you can make it. Start with the water regulations. Make sure that you have all of your sampling and monitoring tasks listed (some of these tasks may end up being the responsibility of the manager, not the operator. Make sure you list everything required by the regulations). List the operational items that need to be done to keep the utility running on a daily basis (meter reading, returning phone messages, check level of fuel oil, inspect the building for vandalism, collect coins, send out monthly bills, backwashing the filters). List the cleaning that needs to be done (mop floors, dust, garbage picked up, toilets & showers cleaned, etc.). Finally list the mechanical maintenance items that need to be serviced on a regular basis. Start by going system by system. Start with the water source and work your way through the water treatment system, then move on to the heating and electrical systems, and the washeteria equipment if you have it. Use the equipment manuals as a guide to estimate the frequency required for servicing equipment.

Assigning the tasks to staff: Once you have a list of the tasks that are needed to keep the utility operating, and the length of time needed for each task, you will have to assign the tasks to staff and schedule the work for particular days of the week or month. If you have more than 8 hours of daily tasks, then you will need more than one person working for the utility. If you have only 4 hours of daily tasks, then maybe one person can do all of the work needed to run the utility (maybe it is you!). You will have to balance the tasks between days of the week and personal, so that there are roughly the same hours of work per day each day and per person.

Once you have scheduled the tasks on particular days and assigned the tasks to staff members, then you have your O&M schedule. Allow time each day (or week) for non-routine tasks – see below.

Once you have all the tasks scheduled, review each task and make a list of other resources that are needed to accomplish each task, such as spare parts, chemicals, or cleaning supplies.

Once you have this plan, don't think that you are finished with it. The plan is dynamic, that is, it can and will change. As your operator becomes more efficient, it will take him less time to do the routine tasks. Also you may find that some tasks do not need to be done as often and some tasks need to be done more often, so update the plan.

O&M plan

- Important to have a written plan to budget for staff and materials, and to orient new employees.
- Develop task list based on frequency (daily, weekly, monthly,...) including operational, cleaning and maintenance tasks.
- Balance work load (about the same hours every day) & assign to staff.

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Instructor's Notes

Scheduling Work—Page 4

Speaker Notes

Review the example task lists.

The following are some discussion items that can be used when reviewing the task lists.

1. Note that each of the example sheets (Daily, weekly, ...) would be on a separate sheet.
2. When writing down the tasks, start with the location or the piece of equipment that will be used for the tasks or that requires maintenance. Later, after you have compiled a long list of tasks, you may want to combine the tasks that are in the same location on one sheet to be assigned to the same person, or to be completed on the same day.
3. Note that the length of time it takes to do each task is written down. You can use these figures to determine how many hours your water plant operator needs to work in a week. Don't forget to allow time for non-routine tasks in the schedule.
4. Some non-routine tasks are foreseeable, like cleaning the water storage tank, or painting the building. You may want to hire extra help for these jobs.

DAILY TASKS

Make sure you...

WEEKLY TASKS

Make sure you...

MONTHLY TASKS

Make sure you...

LESS FREQUENT TASKS

Make sure you...

Scheduling Work—Page 4

Example Task Sheets

DAILY TASKS		
Room / Equipment	Make sure you...	Time Needed
Lab or sink/ Chlorine test kit	Test chlorine residual levels as required. Record them on operator report form.	20 minutes
Well pump house/ control panel	Record the count indicator and hours run time for each pump	5 minutes
Water plant/ Raw water meter (1)	Record the raw water meter reading on the form; subtract from previous reading; compare to daily average; is it significantly different?; if so, why? Leaking pipe or frozen well?	5 minutes

WEEKLY TASKS		
Room / Equipment	Make sure you...	Time Needed
Water plant/ Chlorine injector	Inspect chlorine injection point. Clean if needed.	20 minutes
Water plant/ cleaning	Clean the water plant, remove all trash, and sweep and mop the floor.	1 hour
Lift station/ Wet well trash basket	Inspect the trash basket in the wet well. Empty basket if needed.	15 minutes

MONTHLY TASKS		
Room / Equipment	Make sure you...	Time Needed
Lab or sink/ Water sample	Collect a water sample and send it to a lab for bacteriological analysis. DO THIS AT THE BEGINNING OF THE MONTH.	20 minutes
Monthly operator report	Complete and send the monthly operator report to ADEC.	20 minutes
Bulk fuel tanks	Check and record the levels of fuel in the bulk fuel tanks.	30 minutes

LESS FREQUENT TASKS		
Equipment/ Frequency	Make sure you...	Time Needed
Water Storage Tank/ Annually	Clean water storage tank: Drain tank, pump out remaining water, mop up mud and any biofilm with chlorine solution, fill tank w/ chlorinated water, take bacteriological water sample.	8 hours
Office/Annually	Write Consumer Confidence Report.	1 days
Boiler/ Annually	Clean exhaust stacks	2 hours

**Scheduling
Work**

Instructor's Notes

Scheduling Work—Page 5

Speaker Notes

Have the class look at the **Example Weekly schedule for one location (water plant)** on the opposite page.

Ask the class what they think of this form.

How would the operator want to use this form?

- To remind him what needs to be done each week.
- To remind him to check with the manager for work orders.
- To remind him to turn in work orders to the manager.

Would the operator use this form to record the results from the readings he is taking?

- This form is not for recording the results from reading the water meters or the chlorine residual tests. This form is just the reminder of what tasks need to be done. The good thing about this form is that a whole weeks worth of tasks can usually fit on one sheet. There are usually several data forms, and they usually contain a whole months worth of data. If an operator turned the data forms in to the manager, the manager would not see that some readings may have been missed until the next month. By using this form, the manager sees that the operator is performing the tasks every week.

What are some of the good points?

How could this form be improved?

There is a blank form in Appendix A4.

DAILY TASKS		For week of:						
Make Sure You...	S	M	T	W	T	F	S	

WEEKLY TASKS		
Make Sure You...	Day of week	✓
	Monday	
	Tuesday	
	Wednesday	
	Thursday	
	Friday	

Scheduling Work—Page 5

Example Weekly Schedule for one location (water plant)

DAILY TASKS IN THE WATER PLANT		For week of:					
Make Sure You...	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Check and record temperature inside building							
Check and record water level of storage tank							
Read and record raw water meter							
Read and record outgoing water meter							
Read and record pressure pump starts and hours							
Read and record pressure Δ from filters							
Backwash filter if needed							
Test chlorine residual and record on operator report form							

Scheduling
Work

WEEKLY TASKS IN THE WATER PLANT		
Make Sure You...	Day of week	✓
Complete repairs or outstanding work orders:	Monday	
Mix new batch of chlorine; inspect and clean chlorine injection point	Tuesday	
Do one of the scheduled monthly tasks:	Wednesday	
Complete repairs or outstanding work orders:	Thursday	
Clean building; sweep, mop floors; take out the garbage	Friday	

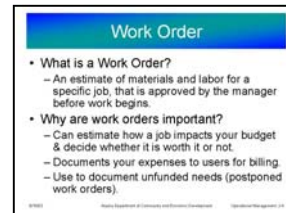
Instructor's Notes

Scheduling Work—Page 6

Speaker Notes

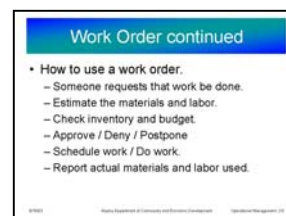
Slide 2-4

1. Ask if anyone can explain what a “Work Order” is.
 - Similar concept to a “Travel Order” or a “Purchase Order”
 - It is a request for approval to do an estimated amount of work.
 - Once approved, the work is scheduled.
2. Why are work orders important?
 - A work order provides documentation for work NEEDS and for work ACCOMPLISHED.
 - If you need to show that you have a NEED, you can use a stack of unfilled work orders
 - If you want to show that you have ACCOMPLISHED something, show a stack of completed work orders.
3. Find out if any of the participants have used work orders before. If there are any that have used them, ask them to describe their experiences, either good or bad.



Slide 2-5

1. How do you use a work order?
 - First there is a request for work to be done by someone (the manager, the operator, a customer, ...)
 - Estimate the labor, parts, and equipment needed for the work
 - The manager checks that there is enough money to do the work. The operator checks to see that there are parts and equipment.
 - The manager either approves, denies, or postpones the work.
 - If approved, the work is scheduled, and eventually completed.
 - The final cost for the work is calculated. This information can be used to help plan similar jobs in the future.



Review the sample work order on the following page

Scheduling Work—Page 6

Non-Routine Tasks

What is a work order?

A work order is a way of documenting work done that is not on the operation and maintenance plan. It is an estimate of materials and labor for a specific job.

Why are work orders important?

Work orders are important for several reasons. First, they let the manager know how a non-routine job will affect the budget. The manager can then decide if the job is “worth” doing at this time, or whether it should be postponed until there is either more time or money. Second, a work order is a way of estimating and documenting expenses that you may have to charge one of your users. For example hooking up a new water service line, or disconnecting someone who doesn’t pay their bills. And third, work orders can be used to document unfunded needs at the utility. If the building needs to be painted, fill out a work order, but postpone it. Gather up all the postponed work orders and show your council all the work that needs to be done at the utility, but that you do not have money for.

Work Order

- **What is a Work Order?**
 - An estimate of materials and labor for a specific job, that is approved by the manager before work begins.
- **Why are work orders important?**
 - Can estimate how a job impacts your budget & decide whether it is worth it or not.
 - Documents your expenses to users for billing.
 - Use to document unfunded needs (postponed work orders).

9/18/03
Alaska Department of Community and Economic Development
Operational Management 2-4

**Scheduling
Work**

How do I use work orders?

An example work order is shown on the following page (a blank one is in the appendix). The work order has two parts. The upper part gets filled out first. It is the estimate of the materials and labor for the job. The lower part is for the actual materials and labor that was used on the job.

Who fills out the work order? Either the operator, the manager, or both of you together can fill it out. Once the estimate is complete, the manager can then check the budget and the inventory to see if it is possible to do the job. The manager either approves, denies, or postpones the work. If the work order is approved, the manager schedules a time for the work to be done. After the job is completed, the actual materials and labor used are filled in so the manager knows how much the job really costs.

Work Order continued

- **How to use a work order.**
 - Someone requests that work be done.
 - Estimate the materials and labor.
 - Check inventory and budget.
 - Approve / Deny / Postpone
 - Schedule work / Do work.
 - Report actual materials and labor used.

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Operational Management 2-5

Instructor's Notes

Scheduling Work—Page 7

Speaker Notes

Example Work Order on opposite page

This is a work order for a non-routine task: cleaning out the water storage tank. Water storage tanks need to be cleaned out annually or every two years, depending upon how much sediment builds up in them.

Discussion questions about the example work order:

1. How does the estimated cost compare to the actual cost? (The actual cost is less than the estimate)
2. Why are the water pump and the pressure washer listed if there is no “cost” involved? (They are listed in the estimate so the manager and the operator knows what equipment is needed for the job. This helps in estimating future jobs when the equipment may not be on hand.)

Example Work Order

Job Number: 45-12345 Job Description: Clean out water storage tank
 Estimated cost: \$1,200.00 Actual cost: \$850.00
 Date: 11/18/2003 Operator: J. Doe

Materials Description	Quantity	Unit	Unit Cost	Total Cost
1. Clean tank	1	hour	\$1,200.00	\$1,200.00
2. Water pump	1	hour	\$1,200.00	\$1,200.00
3. Pressure washer	1	hour	\$1,200.00	\$1,200.00
Total				\$3,600.00

Labor Description	Quantity	Unit	Unit Cost	Total Cost
1. J. Doe	1	hour	\$850.00	\$850.00
Total				\$850.00

Example Work Order continued

Job Number: 45-12345 Job Description: Clean out water storage tank
 Estimated cost: \$1,200.00 Actual cost: \$850.00
 Date: 11/18/2003 Operator: J. Doe

Materials Description	Quantity	Unit	Unit Cost	Total Cost
1. Clean tank	1	hour	\$1,200.00	\$1,200.00
2. Water pump	1	hour	\$1,200.00	\$1,200.00
3. Pressure washer	1	hour	\$1,200.00	\$1,200.00
Total				\$3,600.00

Labor Description	Quantity	Unit	Unit Cost	Total Cost
1. J. Doe	1	hour	\$850.00	\$850.00
Total				\$850.00

Work on Exercise 2-3, the Scheduling Work Orders

Scheduling Work—Page 7 Work Order

Date: 6/2/2005	Work Requested by: O. Perator	Work order number: 2005-06-01		
Description of work requested:				
Clean out water storage tank.				
Date Required: 6/9/2005		Work Order Approved by: A. Minnie Strator		
Cost Estimate of Required Work				
Materials Description	Quantity	Unit	Unit Cost	Total
1. Calcium hypochlorite	5	lbs	\$ 1.00	\$ 5.00
2. Mop head	3	each	\$ 5.00	\$ 15.00
3. Bacteriological water test (including mail)	2	each	\$ 30.00	\$ 60.00
4.			\$	\$
			Total	\$ 80.00
Labor/Equipment Estimate	Quantity	Unit	Unit Cost	Total
1. Primary Operator	8	Hours	\$ 14.00	\$ 112.00
2. Laborer (2 people)	12	Hours	\$ 9.00	\$ 108.00
3. Water pump	4	Hours	\$ 0.00	\$ 0.00
4.		Hours	\$	\$
Total hours labor required for work			Total	\$ 220.00
			Total Cost Estimate	\$ 300.00
Date work performed: 6/12/2005		Work performed by: O. Perator		
Description of work performed:				
Clean out water storage tank.				
Actual Cost of Work Performed				
Materials Description	Quantity	Unit	Unit Cost	Total
1. Calcium hypochlorite	8	lbs	\$ 1.00	\$ 8.00
2. Mop heads	1	each	\$ 5.00	\$ 15.00
3. Bacteriological water test	1	each	\$ 30.00	\$ 30.00
4. Gasoline	1	gal	\$ 4.00	\$ 4.00
			Total	\$ 57.00
Labor/Equipment	Quantity	Unit	Unit Cost	Total
1. Primary Operator	6	Hours	\$ 14.00	\$ 84.00
2. Laborers	6	Hours	\$ 9.00	\$ 54.00
3. Water pump	2	Hours	\$ 0.00	\$ 0.00
4. Pressure washer	1	Hours	\$ 0.00	\$ 0.00
Total hours labor used for work			Total	\$ 138.00
			Total Cost	\$ 195.00

Scheduling
Work

Instructor's Notes

Scheduling Work—Page 8

Speaker Notes

Scheduling Work Review and Worksheet

1. Review what was covered in this Unit on Scheduling Work.
2. Review the Key Concepts and Key Terms at the beginning of the Unit, and ask if there are any questions.
3. Begin work on the worksheet: The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion.

Worksheet Answers

1. True or **False**: Every certified water treatment plant operator is required to maintain a written schedule showing when water samples will be taken and equipment will be serviced.

Water plant operators are not REQUIRED to have a work plan, but it is a good idea to have one.

2. **True** or False: A written work schedule for the water plant operator can help justify how many work hours a day are required to maintain the water plant.

3. Check all of the following tasks that should be listed on the DAILY TASK SHEET:

- ☐ Check chlorine residual and record on operator report form **YES DAILY**
- ☐ Collect and mail water bacteria test samples **NO MONTHLY**
- ☐ Read and record water meter readings in the water treatment plant **YES DAILY**
- ☐ Take out the garbage and sweep and mop the floor. **MAYBE, BUT PROBABLY NO WEEKLY**

4. True or **False**: Work orders are not really needed for small utilities when the Utility Manager and the Water Operator are the same person.

Size of the utility or number of employees has nothing to do with doing work orders or not. Work orders are a way to documents NEEDS and ACCOMPLISHMENTS and estimate work.

Action Plan

After doing the worksheet, complete the Action Plan for this Unit.

Scheduling Work—Page 8

Scheduling Work Review and Worksheet

This Unit was about the manager's role in scheduling work. Topics covered included why it is important to have a written schedule of work, and how to create a schedule for routine and non-routine tasks.

Worksheet

1. True or False: Every certified water treatment plant operator is required to maintain a written schedule showing when water samples will be taken and equipment will be serviced.
2. True or False: A written work schedule for the water plant operator can help justify how many work hours a day are required to maintain the water plant.
3. Check all of the following tasks that should be listed on the DAILY TASK SHEET:
 - ☐ Check chlorine residual and record on operator report form
 - ☐ Collect and mail water bacteria test samples
 - ☐ Read and record water meter readings in the water treatment plant
 - ☐ Take out the garbage and sweep and mop the floor.
4. True or False: Work orders are not really needed for small utilities when the Utility Manager and the Water Operator are the same person.

 Scheduling
Work

Action Plan

Write down at least one thing (and no more than three) that you learned this lesson (Scheduling Work) that could be done in your community.

1. _____

2. _____

3. _____

Instructor's Notes

Scheduling Work—Page 9

Cleaning

Speaker Notes

Cleaning

Since this material does not have to do directly with scheduling work, it is presented after the main part of the Unit.

Review this material if the participants are interested.

Review the importance of keeping a facility clean

Review the guidelines for keeping a facility clean.

Scheduling Work—Page 9

Cleaning

A clean water treatment plant shows the world that it is well cared for, and has a positive impact on the visual impression. A clean water plant encourages people to believe that the water the plant produces is also clean. Conversely, a water plant that is not clean raises doubts in the consumers' mind whether the water is safe to drink.

Many water plants in rural Alaskan villages are attached to a washeteria, which usually include restrooms, showers, and laundry facilities. These facilities are very important for the public health of the community, and are just as important as having clean water to drink. Hygiene is also linked to health.

What does a utility or facility manager need to know about keeping a water plant or washeteria clean?

First, the manager needs to recognize the difference between a clean and an unclean facility. Next the manager needs to know how much time is required to keep the facility clean. Is it worth having the washeteria open 24 hours / 7 days a week, if you have to pay an attendant to clean it every 8 hours. Does it make better sense to only have it open 4 days a week for 6 hours a day. Then the cleaning person only has to come in 4 times a week. How do you determine how long it takes to clean the facility. Well, take over the cleaning duties yourself for a week while the attendant is on vacation and see for yourself. Are you giving the attendant enough time to complete the work that you expect, or should the attendant be able to do more?

After you have determined exactly what should be accomplished, you should provide the attendant with a work checklist. (A sample is provided on the next page, and on the CD). Your staff will benefit from a clear statement of what is expected. Start with some guidelines for what the restrooms should look like when cleaning is finished. The next step is outlining particular daily restroom cleaning procedures that will achieve those desired goals:

What is the “proper” way to clean a room, such as a restroom.

Sample Guidelines:

- All surfaces should be free of visible soil
- All contact surfaces should be disinfected
- Trash should be dumped and liners replaced
- Mirrors and chrome should be spot free and shining
- Paper products and soap should be restocked and dispensers operational
- Floors should be free of litter, dirt and built up moisture
- Soil should not be visible on vents, partitions tops or ledges,.
- No graffiti should be visible
- All drains should flow freely
- No stains, discoloration or soil should be visible on fixtures or dispensers

Sample procedures:

- Collect trash and litter from the floor and other surfaces and place in waste collection bag.
- Empty those waste receptacles that are more than one-half full.
- Inspect and fill paper towel, and soap dispensers if less than one half full. Test them for proper operation. Spot clean exteriors.
- Inspect all basins, and spot clean those that are visibly soiled with a disinfectant solution.
- Inspect urinals, flush as needed, and spot clean those that are visibly soiled.
- Inspect unoccupied stalls, flush fixtures as needed, and spot clean those that are visibly soiled using a disinfectant solution. Spot clean partitions and stall door walls. Refill empty toilet paper and seat cover dispensers.
- Clean wet or soiled floor areas with a mop and disinfectant detergent solution. Use “wet floor” signs, and if possible, schedule cleaning when the building is not open to the public.

Instructor's Notes
Scheduling Work—Page 10
Weekly Restroom Maintenance Program Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank weekly restroom maintenance program form will meet the needs of most rural water utilities in Alaska.
3. This form is very similar to the other schedule forms, but is specifically designed for restroom maintenance.

WEEKLY RESTROOM MAINTENANCE PROGRAM

Products:

1. Restroom cleaner
2. Disinfectant cleaner
3. Glass/chrome cleaner
4. Hand cleaner

Supplies:

1. Paper towels
2. Tissue

Tools:

1. Mop/bucket/wringer
2. Disinfectant spray bottle
3. Broom and dustpan
4. Bowl swab mop & caddie

DUTIES	COMMENTS	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1. Check for graffiti and other vandalism								
2. Empty waste baskets								
3. Spot clean walls and doors								
4. Clean: A. Mirrors								
B. Windows								
C. Sinks—Chrome								
D. Bathtubs								
E. Shower walls								
F. Commodes/Urinals inside								
G. Commodes/Urinals outside								
H. Commode seats								
I. Counters								
J. Wall partitions								
5. Sweep floors								
6. Wet mop floors								
7. Disinfect: A. Toilet seats								
B. Flush handles								
C. Door knobs								
D. Waste baskets								
E. Sanitary napkin disposal								
8. Check: A. Paper towels								
B. Tissue								
C. Seat covers								
D. Trash liners								
E. Hand cleaner dispenser								
F. Room Deodorizer								

Instructor's Notes Scheduling Work—Page 11

Daily Task Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank daily task form will meet the needs of most rural water utilities in Alaska.
3. When writing down the tasks, start with the location or the piece of equipment that will be used for the tasks or that requires maintenance. Later, after you have compiled a long list of tasks, you may want to combine the tasks that are in the same location one to one tasks sheet to be assigned to the same person, or to be completed on the same day.
4. An example would be:

DAILY TASKS

Room / Equipment	Make sure you...	Time Needed
Lab or sink/ Chlorine test kit	Test chlorine residual levels as required. Record them on operator report form.	20 minutes
Well pump house/ control panel	Record the count indicator and hours run time for each pump	5 minutes
Water plant/ Raw water meter (1)	Record the raw water meter reading on the form; subtract from previous reading; compare to daily average; is it significantly different?; if so, why? Leaking pipe or frozen well?	5 minutes

DAILY TASKS

[illegible]

Instructor's Notes

Scheduling Work—Page 12

Weekly Task Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank weekly task form will meet the needs of most rural water utilities in Alaska.
3. When writing down the tasks, start with the location or the piece of equipment that will be used for the tasks or that requires maintenance. Later, after you have compiled a long list of tasks, you may want to combine the tasks that are in the same location one to one tasks sheet to be assigned to the same person, or to be completed on the same day.
4. An example would be:

WEEKLY TASKS

Room / Equipment	Make sure you...	Time Needed
Water plant/ Chlorine injector	Inspect chlorine injection point. Clean if needed.	20 minutes
Water plant/ cleaning	Clean the water plant, remove all trash, and sweep and mop the floor.	1 hour
Lift station/ Wet well trash basket	Inspect the trash basket in the wet well. Empty basket if needed.	15 minutes

WEEKLY TASKS		
Room / Equipment	Make sure you...	Time Needed

--

[illegible]

Instructor's Notes

Scheduling Work—Page 13

Monthly Task Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank monthly task form will meet the needs of most rural water utilities in Alaska.
3. When writing down the tasks, start with the location or the piece of equipment that will be used for the tasks or that requires maintenance. Later, after you have compiled a long list of tasks, you may want to combine the tasks that are in the same location one to one tasks sheet to be assigned to the same person, or to be completed on the same day.
4. An example would be:

MONTHLY TASKS

Room / Equipment	Make sure you...	Time Needed
Lab or sink/ Water sample	Collect a water sample and send it to a lab for bacteriological analysis. DO THIS AT THE BEGINNING OF THE MONTH.	20 minutes
Monthly operator report	Complete and send the monthly operator report to ADEC.	20 minutes
Bulk fuel tanks	Check and record the levels of fuel in the bulk fuel tanks.	30 minutes

MONTHLY TASKS

Room / Equipment

Make sure you...

Time Needed

[illegible]

Instructor's Notes

Scheduling Work—Page 14

Monthly Task Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank monthly task form will meet the needs of most rural water utilities in Alaska.
3. When writing down the tasks, start with the location or the piece of equipment that will be used for the tasks or that requires maintenance. Later, after you have compiled a long list of tasks, you may want to combine the tasks that are in the same location one to one tasks sheet to be assigned to the same person, or to be completed on the same day.
4. An example would be:

LESS FREQUENT TASKS

Equipment/ Frequency	Make sure you...	Time Needed
Water Storage Tank/ Annually	Clean water storage tank: Drain tank, pump out remaining water, mop up mud and any biofilm with chlorine solution, fill tank w/ chlorinated water, take bacteriological water sample.	8 hours
Office/ Annually	Complete Consumer Confidence Report	1 day
Boiler/ Annually	Clean exhaust stacks	2 hours

LESS FREQUENT TASKS

Equipment/
Frequency

Make sure you...

Time Needed

[illegible]

Instructor's Notes
Scheduling Work—Page 15
Weekly Schedule for location Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank weekly schedule form will meet the needs of most rural water utilities in Alaska.
3. You may want a separate weekly schedule list for each person (like the primary operator or the washeteria attendant), or each location (like the water treatment plant, lift station).

DAILY TASKS at:					For week of:		
Make Sure You...	Sun	Mon	Tue	Wed	Thu	Fri	Sat

WEEKLY TASKS		
Make Sure You...	Day of week	✓
	Sunday	
	Monday	
	Tuesday	
	Wednesday	
	Thursday	
	Friday	
	Saturday	

Instructor's Notes
Scheduling Work—Page 16
Work Order Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank Work Order form will meet the needs of most rural water utilities in Alaska.
3. Use the top portion of the form to estimate how much the job will cost, both in materials and labor. This will allow you to make sure you have enough money in the budget to cover the cost, or how much to charge one of your users in the case of water service line hook-up or repair. Use the bottom portion of the form to document the actual cost.

Work Order

Date:	Work Requested by:	Work Order number:		
Description of work requested:				
Date Required:		Work Order Approved by:		
Cost Estimate of Required Work				
Materials Description	Quantity	Unit	Unit Cost	Total
1.			\$	\$
2.			\$	\$
3.			\$	\$
4.			\$	\$
5.			\$	\$
			Total	\$
Labor/Equipment Estimate	Quantity	Unit	Unit Cost	Total
1.		Hours	\$	\$
2.		Hours	\$	\$
3.		Hours	\$	\$
4.		Hours	\$	\$
5.		Hours	\$	\$
Total hours labor required for work			Total	\$
		Total Cost Estimate		\$
Date work performed:		Work performed by:		
Description of work performed:				
Actual Cost of Work Performed				
Materials Description	Quantity	Unit	Unit Cost	Total
1.			\$	\$
2.			\$	\$
3.			\$	\$
4.			\$	\$
5.			\$	\$
			Total	
Labor/Equipment	Quantity	Unit	Unit Cost	Total
1.		Hours	\$	\$
2.		Hours	\$	\$
3.		Hours	\$	\$
4.		Hours	\$	\$
5.		Hours	\$	\$
Total hours labor used for work			Total	\$
		Total Cost		\$

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Unit 3 Data Collection & Reporting

Data

Instructor's Notes

Data Collection and Reporting—Page 1

Instructor class preparation

1. There are three exercises in this Unit. Make sure you are familiar with the exercises before you begin. The directions for all 3 exercises are on one sheet of paper.
2. There are three sample forms for this Unit.
3. The heart of this Unit how to determine what data to collect, and what data to ignore. The second major point of this Unit is to emphasize what to do with the data once you have it.

Lesson Length: 4 hours

Schedule:

- | | |
|------------------------------------|--------|
| • Exercise 3-1 Finding Use in Data | 30 min |
| • Data Collection | 30 min |
| • Exercise 3-2 Operating Data | 30 min |
| • Data Forms | 30 min |
| • Break | 20 min |
| • Exercise 3-3 Creating Data Forms | 40 min |
| • Reporting Data | 15 min |
| • Review Sample Report form | 15 min |
| • Review/Worksheet/Action Plan | 30 min |

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Data

Speaker Notes

Exercise 3-1: Turn to page 5

Slide 3-1

1. Review the schedule for this Unit (adjust schedule if needed based on the results of the self assessment).
2. Review the **Learning Objective** and the **Key Concepts to Learn** for the Unit.
3. Confirm which topics to focus the most attention on based on the class expectations.



Data Collection and Reporting—Page 1

Learning Objectives

After completing this Unit you should understand what data is important for you to collect, analyze, use and report, and what data you want to ignore.

Key Concepts to Learn

- How to decide what data to collect
- How to develop forms to collect data
- How to analyze and use data
- How to report data

Key Terms to Know

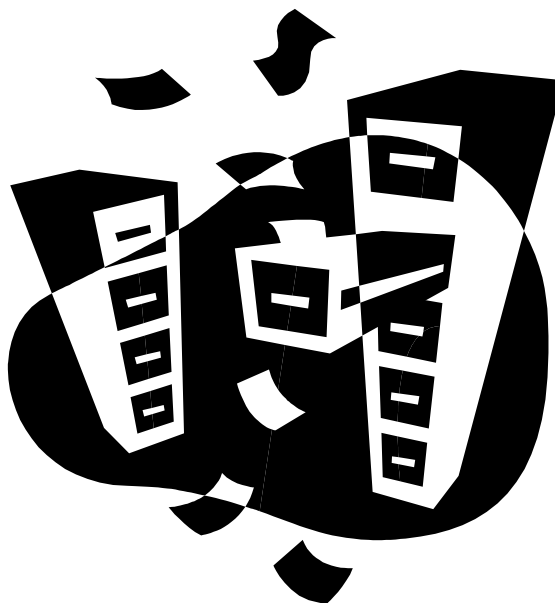
- Regulatory data
- Operating data
- Financial data

Data Collection and Reporting

Topics for this lesson

- How to decide what data to collect
- How to design forms for data collection
- How to use data
- How to report data

10/1/2003
Alaska Department of Community and Economic Development
Operational Management 3-1



Data

References used to develop this Unit

- Jordan, JK, Maintenance Management, American Water Works Association, 1990
- Preventive Maintenance Tasks for Tribal Drinking Water Systems, United States Environmental Protection Agency, Office of Water, EPA 816-F-01-017, June 2001
- Small Water System Operation and Maintenance, A Field Study Training Program, Second Edition, California Department of Health Services, Sanitary Engineering Branch, U.S. Environmental Protection Agency, Office of Drinking Water, 1990
- Utility Management, A Field Study Training Manual, 1st Edition, California State University, Sacramento, Office of Water Programs, 2001
- Water Distribution Operator Training Handbook, American Water Works Association, 1976
- Water Utility Management: AWWA Manual M5, American Water Works Association, 1999

Instructor's Notes**Data Collection and Reporting—Page 2****Speaker Notes****Slide 3-2**

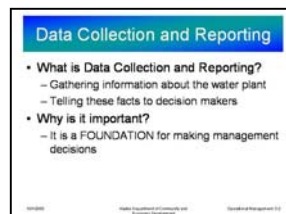
After working on Exercise 3-1, and discussing conclusions that can be drawn from the listed data, ask if the participants:

- If felt this was a useful exercise?
- Did they see a value in looking at the data and drawing a conclusion? If not, why?

Discuss what data collection and reporting is (as defined in the text).

- Emphasize that it is gathering data to be used for making decisions.
- That is why it is so important (for decision making).

Remind the participants that some data is required to be collected and reported by regulators (e.g. daily chlorine and/or fluoride residuals)



Data Collection and Reporting—Page 2

This lesson is about why data is important in the operation of the water utility, what kind of data should be collected and how, and how the data should be used and reported.

What is data collection and reporting?

Data collection [for Utility Managers] is the gathering of information about the operation of your water plant that is either required by law or required for your organization's own internal needs.

Reporting data is informing those that need to know about the operation of your facility by telling them the results of the data you collected.

Data Collection and Reporting

- **What is Data Collection and Reporting?**
 - Gathering information about the water plant
 - Telling these facts to decision makers
- **Why is it important?**
 - It is a FOUNDATION for making management decisions

10/1/2008
Alaska Department of Community and Economic Development
Operational Management 3-2

Why is data collection and reporting important?

There are many decisions that have to be made about operating a utility, like how many hours the water plant operator should work, what rate the utility should charge for a gallon of water, and how much fuel oil is needed to get through the winter. To make these decisions without basing them on data collected over the past year(s), is just guessing, and is inefficient. Without having good data to base a decision, you may order more fuel oil than you need, using up money that you might have needed later for other expenses. Or you might not order enough fuel oil, jeopardizing your entire water system with a freeze-up if the boilers stop. Data collection is important, but just writing it down is not enough. Once you have the data you have to do something with it. You have to record it in such a way that it is easy to interpret and useful for the people that need to use it. Data collection and reporting is the foundation for many decisions that are made about operating the utility.

In this unit the utility manager will learn:

- Types of data that should be collected and why
- How to develop forms for collecting data
- How to use data
- How to report data

What kind of data needs to be collected?

It is possible for your water utility to generate an almost infinite amount of data. It is up to you to decide what is important for you to know and keep track of so that you can operate the plant most efficiently. There are several broad categories of data:

- Regulatory: data that you are required by law to collect and report.
- Operating: data about how much water, electricity, chemicals, and fuel, the water plant uses or makes.
- Financial: data about the income and expenses for the facility (this topic is covered in depth in the Financial Management course)

This unit focuses more on the regulatory and operating types of data (most of the regulatory data is actually operating data. The regulators want operating data about your water treatment plant so that they can draw their own conclusions about whether your water treatment plant is providing safe water to the public).

Instructor's Notes

Data Collection and Reporting—Page 3

Speaker Notes

Slide 3-3

Discuss what regulatory data is required by the State:

- Operator reports with:
 - Turbidity results if treating surface water
 - Daily chlorine residual
 - Daily fluoride residual
- Monthly bacteria test results (don't forget sampling point chlorine residual)
- Water test results for inorganics, VOC/SOC, lead/copper, radionuclides, etc., at the frequency required by the regulations (some are water system dependant).
- Consumer Confidence Report (CCR) annually
- Sanitary Survey every 5 years.



Discuss the two examples of operating data listed in the text.

Exercise 3-2

Brainstorm other examples of operating data that might be useful and why it would be useful. For each example of operating data determine:

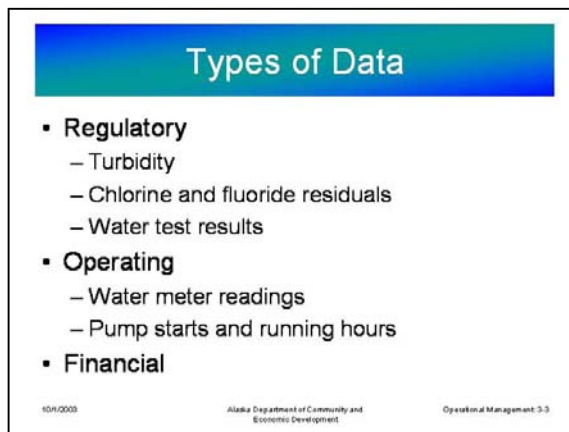
- how the data would be collected (written on a sheet of paper for example) (don't worry about how to design the form for the piece of paper, that is the next exercise)
- who would collect it
- how often

Later we will come back and discuss how to use this operating data.

Data Collection and Reporting—Page 3

Regulatory Data

There is not much regulatory data that is required to be collected and reported, but it is very important. There are certain things that every water utility in the country has to do to ensure the regulating authorities (and the public) that the water they are providing their customers is safe to drink. Every Class A water system in Alaska is required to submit a monthly operator report to the Alaska Department of Environmental Conservation, the State Agency that has primacy over the drinking water regulations. The operator report contains information about the turbidity of the water before and after treatment if the water plant water uses surface water as a source; and how much chlorine and or fluoride is in the water (if either is used). To complete this report, the operator must write down the information daily. If this information is not collected and reported, the utility could be fined, or reduce their potential for competing for grants for the water system. When this information is not reported, the regulating authority may assume that the water system is not being operated in a way that provides safe water.



Operating Data

There is all kinds of operating data that can be collected about you water treatment plant. Operating data is information about how much water flows through the pipes in the water plant, how much electricity, fuel oil and chemicals are being used, and how the equipment is operating. You have to decide what information is important for you. Some operating data will be much more useful for your water plant operator than it will be for you; and some operating data will be much more useful for you than him. You will have to explain to your operator the importance of collecting the data and why. If after a while you are collecting data and find that you are not doing anything with the data, stop wasting your time and don't collect it anymore. Your time is valuable. Data is meant to be used.

Data

Examples of operating data that might be useful and why:

- **Water flow into the plant (gallons):** you can use this number to find out much water is treated per day/month/year, etc. Daily water flow is important for your operator to calculate and observe. A sudden increase in daily flow might mean there is a leak somewhere in the system; a sudden decrease might mean a pump has malfunctioned. Annual water flow is important for you to calculate. If you know how much your expenses are for a year (dollars), you can divide your expenses by the water flow to find out how much it costs you to make a gallon of water (dollars/gallon). Then you will know if your water rates are fair.
- **Pump start counts & pump running hours:** Many pump control panels have a device that counts the number of times a pump starts and have a device that measures how many total hours a pump has run. These numbers should be written down daily. Under normal circumstances, a pump will usually run about the same number of hours each time it turns on during the day. By dividing the run time by the start counts, the pump cycle time (the amount of running time each time the pump starts) can be determined. If you notice that the pump cycle time is starting to become larger over time, then conditions at the water plant are changing. Maybe it means that people are using more water, there are leaks in the water system, or the pump impeller is wearing out. In any case, you will be aware that something is different, and you can investigate to try to determine what change has occurred to find out if there is a significant problem.

Instructor's Notes

Data Collection and Reporting—Page 4

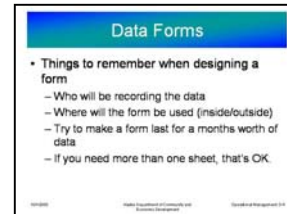
Speaker Notes

Slide 3-4

Data Forms:

Review the suggestions in the text for designing forms that will work well. Remember:

- Who will be recording the information
- Where the form will be used
- Try to use 1 page per month
 - This reduces the amount of paperwork (only 12 data forms in one year is pretty easy to manage and keep track of)



Exercise 3-3

Create data forms for the various components of the Muddy River Water and Sewer Utility as described in Exercise 2-1. (Hint, there should be a spot on a form for every task that said read and record something). You can use the blank routine daily data collection form as a start.

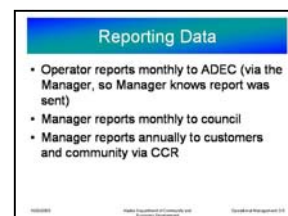
Review Exercise 3-1 as an example of what to do with data that you have collected (as a way to analyze data). Also review the types of operating data that were developed under Exercise 3-2. Discuss how this data can be used to determine if the water treatment plant is operating correctly.

Slide 3-5

Reporting data:

Discuss what data should be reported to whom.

- Operator should report monthly to ADEC (via the Manager so that the Manager knows that it was done)
- The Manager should report to the Council monthly.
- The Manager should report to the customers/community at least annually.



Data Collection and Reporting—Page 4

Forms for data collection

How do I make forms for data collection?

The State provides the form for the monthly operator report.

When making a form, remember who will be writing down the information and make the form appropriate for them. These forms do not have to be complicated. The simpler, the better. Operating data is typically recorded on a daily basis and is usually numbers of some kind, so putting the information into a table is usually the most useful way to record the information. Typically a whole month's worth of information can be recorded on one sheet of paper. To make a form for collecting operating data, make a table with about 35 rows and three or four columns, depending on how many different things you want to write down. Leave the top row blank for your headings, then number the 2nd row down through 31. These rows will be days of the month. The bottom rows can be used for totals. You may need more than one sheet to collect all the data you want. That is OK. It is better to have more sheets that are legible, than to have one sheet with a bunch of numbers squished into small blocks.

If you have more than one sheet, trying grouping the information on each sheet by area in the water treatment plant, so the operator can collect all the data from one area at one time.

Reporting data

What do I do with the data?

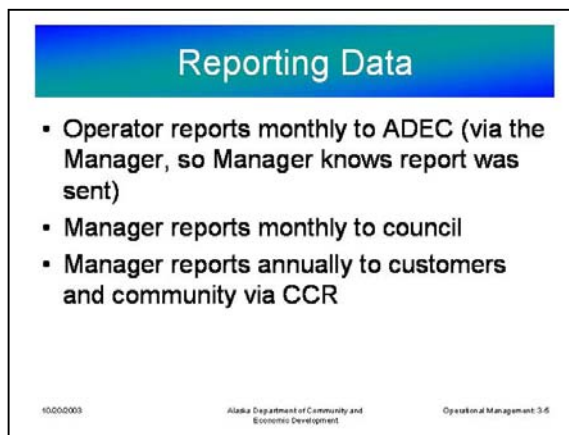
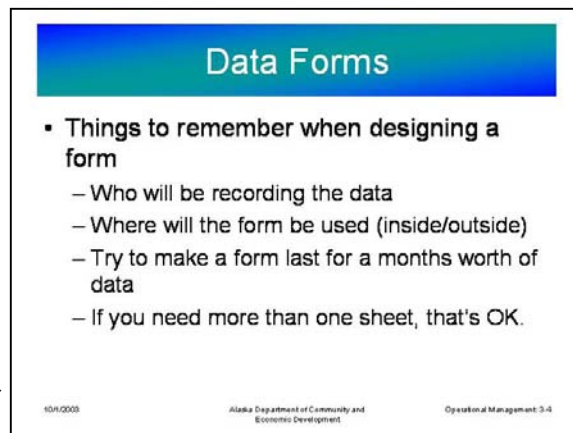
Compile it, compare it to yesterdays, last weeks, last months, last years, data to see if everything is operating normally.

What do I report and who do I report to?

The operator should give you his monthly operating report to be mailed or faxed to ADEC. This way you will know that it is done, and your utility is in compliance with part of the reporting requirements. The operator should also give you the monthly totals for the data that you decided you wanted collected.

You should prepare a monthly report for your council with the monthly totals for the data you collected. Show the comparison to last month and if there are any significant differences, explain why you think they are there.

Prepare an annual report for your customers explaining how much water, fuel, electricity was used. Include this information in your annual consumer confidence report. This will help them understand why they have to pay for the water they use.



Instructor's Notes

Data Collection and Reporting—Page 5

Speaker Notes

Exercise 3-1 Finding Use in Data

Ask the class to look at the data form on Page 5. Ask them what conclusions can be drawn from this data?

Slide 3-6

1. This is an example of a daily routine data collection form.
2. This form contains a whole months worth of data.
3. It has electric meter readings, water tank level, water meter reading from the well, pressure pump starts counts and running hours, and fuel oil consumption.
4. What are some observations about the data in this form:
 - Not every day is filled out (but most are)
 - Looks like the well pump failed on the 12th and was replaced on the 17th
 - During that time the water level in the tank fell 8 feet.
 - The electricity consumption two days after the pump was replaced increased .
 - The pressure pump runs between 9 and 10 hours a day and starts between 50 and 60 times a day.
 - Looks like they use about 7,000 gallons a day (at least that is what this well is producing).

Date	Tank Level	Water Meter	Electric Meter	Pressure Pump Starts	Pressure Pump Hours	Fuel Oil Consumption
9/1	10.0	1000	1000	50	9	7000
9/2	10.0	1000	1000	50	9	7000
9/3	10.0	1000	1000	50	9	7000
9/4	10.0	1000	1000	50	9	7000
9/5	10.0	1000	1000	50	9	7000
9/6	10.0	1000	1000	50	9	7000
9/7	10.0	1000	1000	50	9	7000
9/8	10.0	1000	1000	50	9	7000
9/9	10.0	1000	1000	50	9	7000
9/10	10.0	1000	1000	50	9	7000
9/11	10.0	1000	1000	50	9	7000
9/12	2.0	1000	1000	50	9	7000
9/13	2.0	1000	1000	50	9	7000
9/14	2.0	1000	1000	50	9	7000
9/15	2.0	1000	1000	50	9	7000
9/16	2.0	1000	1000	50	9	7000
9/17	10.0	1000	1000	50	9	7000
9/18	10.0	1000	1000	50	9	7000
9/19	10.0	1000	1000	50	9	7000
9/20	10.0	1000	1000	50	9	7000
9/21	10.0	1000	1000	50	9	7000
9/22	10.0	1000	1000	50	9	7000
9/23	10.0	1000	1000	50	9	7000
9/24	10.0	1000	1000	50	9	7000
9/25	10.0	1000	1000	50	9	7000
9/26	10.0	1000	1000	50	9	7000
9/27	10.0	1000	1000	50	9	7000
9/28	10.0	1000	1000	50	9	7000
9/29	10.0	1000	1000	50	9	7000
9/30	10.0	1000	1000	50	9	7000

Data Collection and Reporting—Page 5

Example Routine Data Collection Form

Rocky Point Water Treatment Plant—Daily Readings for month of Sept. 2002

Day	Electric Meter	KWH used	Water Tank Level (FT)	Well Water Meter (gallons)	Water Today (gallons)	Pump (starts total)	Pump (starts today)	Pump (hours total)	Pump (hours today)	Fuel Oil (gallons)	Fuel used (gallons)
				712,199		3,752		17,965.4			
1	62,416		22	712,273	7,400	3,809	57	17,975.0	9.6		
2	62,515	99	22	712,327	5,400	3,863	54	17,984.0	9.0		
3											
4	62,784	269	20	712,492	16,500	3,974	111	18,002.5	18.5		
5	62,992	208	21	712,645	15,300	4,026	52	18,011.3	8.8		
6	63,118	126	22	712,724	7,900	4,082	56	18,020.6	9.3		
7	63,314	196	23	712,852	12,800	4,140	58	18,030.1	9.5		
8	63,461	147	24	712,942	9,000	4,194	54	18,039.1	9.0		
9	63,595	134	22	712,947	500	4,248	54	18,048.4	9.3		
10	63,605	10	22	713,002	5,500	4,303	55	18,058.0	9.6		
11	63,783	178	23	713,123	12,100	4,364	61	18,067.8	9.8		
12	63,911	128	24	713,195	7,200	4,424	60	18,077.8	10.0		
13	63,955	44	22	713,195	0	4,479	55	18,087.7	9.9		
14	38	?	20	713,195	0	4,539	60	18,096.9	9.2		
15	93	55	18	713,195	0	4,598	59	18,106.8	9.9		
16		?	16	713,195	0	4,652	54	18,116.2	9.4		
17	107	14	20	713,374	17,900	4,710	58	18,125.9	9.7		
18	376	269	23	713,563	18,900	4,768	58	18,135.8	9.9		
19	605	229	23	713,627	6,400	4,826	58	18,145.4	9.6		
20	665	60	21	713,627	0	4,881	55	18,155.4	10.0		
21	789	124	23	713,711	8,400	4,935	54	18,164.8	9.4		
22	875	86	22	713,724	1,300	4,994	59	18,174.6	9.8		
23	991	116	24	713,841	11,700	5,048	54	18,184.1	9.5		
24	1,054	63	22	713,841	0	5,105	57	18,193.9	9.8		
25	1,199	145	23	713,950	10,900	5,158	53	18,203.3	9.4		
26	1,289	90	22	713,986	3,600	5,211	53	18,212.5	9.2		
27	1,409	120	23	714,063	7,700	5,269	58	18,222.5	10.0		
28	1,525	116	23	714,139	7,600	5,325	56	18,232.4	9.9		
29	1,602	77	22	714,150	1,100	5,375	50	18,241.5	9.1		
30	1,763	161	23	714,276	12,600	5,424	49	18,250.4	8.9		
31											
T					207,700						

Data

Instructor's Notes

Data Collection and Reporting—Page 6

Speaker Notes

Slide 3-7

1. This blank pump history form is an example of a non-routine data form.
2. This form can record three sets of pump voltage and amperage readings. These readings may be taken once a year, once a quarter, once a month, or how ever often the operator thinks that it is necessary.
3. Why is it important to have a form to record this data, instead of say—just writing it in a notebook:
 - The form is useful because it reminds the person to collect the SAME data about the piece of equipment every time it is checked, no matter who is collecting the data.
 - The form also makes it easy to compare data from each time it is collected.

Example non-routine data form

Ready Point Water Treatment Plant—Pump History Data Collection Form

Date: _____ Station: _____ Pump: _____

Discharge Pressure: _____ All ☐ All pumps No. 1 ☐
 Flow Rate: _____ gpm ☐ All pumps No. 2 ☐
☐ All pumps No. 3 ☐
☐ All pumps No. 3 ☐
☐ All pumps No. 3 ☐

Voltage	Voltage	Voltage	Amperage	Amperage	Amperage
Load 1	Load 2	Load 3	Load 1	Load 2	Load 3

Form 0001 History Treatment and Control and Pumping Department Standard Operating Procedure 0.0

Data Collection and Reporting—Page 6

Example Non-Routine Data Collection Form

Rocky Point Water Treatment Plant—Pump History Data Collection Form

Date: / /		Operator: _____	
Time: : am/pm		Pump	
Discharge Pressure: _____ psi		<input type="checkbox"/> Well pump No. 1	
Flow rate: _____ gpm		<input type="checkbox"/> Well pump No. 2	
		<input type="checkbox"/> Pressure pump No. 1	
		<input type="checkbox"/> Pressure pump No. 2	
		<input type="checkbox"/> Backwash pump	
Voltage Leads 1-3	Voltage Leads 1-2	Voltage Leads 2-3	
Amperage Lead 1	Amperage Lead 2	Amperage Lead 3	

Date: / /		Operator: _____	
Time: : am/pm		Pump	
Discharge Pressure: _____ psi		<input type="checkbox"/> Well pump No. 1	
Flow rate: _____ gpm		<input type="checkbox"/> Well pump No. 2	
		<input type="checkbox"/> Pressure pump No. 1	
		<input type="checkbox"/> Pressure pump No. 2	
		<input type="checkbox"/> Backwash pump	
Voltage Leads 1-3	Voltage Leads 1-2	Voltage Leads 2-3	
Amperage Lead 1	Amperage Lead 2	Amperage Lead 3	

Date: / /		Operator: _____	
Time: : am/pm		Pump	
Discharge Pressure: _____ psi		<input type="checkbox"/> Well pump No. 1	
Flow rate: _____ gpm		<input type="checkbox"/> Well pump No. 2	
		<input type="checkbox"/> Pressure pump No. 1	
		<input type="checkbox"/> Pressure pump No. 2	
		<input type="checkbox"/> Backwash pump	
Voltage Leads 1-3	Voltage Leads 1-2	Voltage Leads 2-3	
Amperage Lead 1	Amperage Lead 2	Amperage Lead 3	

Data

Instructor's Notes

Data Collection and Reporting—Page 7

Speaker Notes

Slide 3-8

Show the example monthly report form.

1. This blank monthly report form will probably not meet the needs of most rural water utilities in Alaska, but it is provided so that those that want to use it can.
2. This form is used for the manager or the operator to inform the governing council about the current status of the utility. The form contains information on operations, such as how much water was treated at the water plant; information on personnel usage; financial information; and pending work and problems that arose.
3. There is a blank form in the Appendix that can be easily photocopied. This form can be used as a guide for the type of information that a manager would want to report to the Council.
4. Each utility will probably want to come up with their own monthly report form.



The image shows a sample of a 'Monthly Report Form' for a water utility. The form is titled 'Example Monthly Report Form' in a blue header. It contains several sections for data entry, including 'General Information', 'Operations', 'Personnel', 'Financial', and 'Pending Work/Problems'. Each section has a list of items to be reported, with checkboxes for 'Yes' or 'No' and a space for additional comments. The form is designed to be filled out by a manager or operator to provide a comprehensive overview of the utility's status for a given month.

Data Collection and Reporting—Page 7**Example of Utility Monthly Report**

Village of Rocky Point, Alaska Monthly Water Utility Report	
For Month of _____, 20____	Prepared by _____
Operating Information: Water treated: _____ gallons Average daily water use: _____ GPD Electricity used : _____ KWH Average daily electric use: _____ KWH/day Fuel Oil used: _____ gallons Average daily fuel use: _____ GPD Chlorine residual high: _____ Mg/l Chlorine residual low: _____ Mg/l Regulatory information submitted: Operator report YES or NO Bacteria water test sample YES or NO Other samples submitted: _____	Personnel Information: Utility Manager: _____ hours Water operator: _____ hours Laundry attendant: _____ hours Extra labor: _____ hours Other: _____ hours Financial Information: Laundry revenue: \$ _____ Piped water revenue: \$ _____ Hauled water revenue: \$ _____ Other revenue: \$ _____ Total revenue this month: \$ _____ Labor expense: \$ _____ Electricity expense: \$ _____ Fuel oil expense: \$ _____ Other expense: \$ _____ Total expense this month: \$ _____
Work orders postponed or pending completion:	Trouble tickets noted this month:

Data

Instructor's Notes

Data Collection and Reporting—Page 8

Speaker Notes

Scheduling Work Review and Worksheet

1. Review what was covered in this Unit on Data Collection and Reporting.
2. Review the Key Concepts and Key Terms at the beginning of the Unit, and ask if there are any questions.
3. Begin work on the worksheet: The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion.

Worksheet

1. True or **False**: Every temperature gauge, water meter, dial, pressure gauge, etc... in the water treatment plant should be read and recorded daily.

*The Operator and the Manager should decide together what gauges, meters, etc. are important to be read every day. There may be some meters or gauges that do not provide useful data. (This question may be **TRUE** in some instances where there are few meters and gauges in the water plant.)*

2. True or **False**: Once the operating data has been recorded and analyzed for trends, the data sheets can be thrown away.

File the data sheets. You may want to go back and look at past years data (remember Exercise 3-1).

3. True or **False**: There is no need to read the electric meter since the electric utility does it anyway.

You may want to read and record the electric meter reading yourself, and do your own real time calculation on how much electricity the water treatment plant uses, instead of waiting for a 1 month lag in the data to come from the electric utility.

4. An increase in the amount of water recorded on the daily water meter readings over time might indicate which of the following:

- a. **A leak in the water distribution system**
- b. **Increased water usage in the community**
- c. **Increased revenue for the water utility if it charges for water by the gallon**
- d. **More chemicals may be needed to treat the additional water**

Increased water usage could indicate any one of the four items above.

Action Plan

After doing the worksheet, complete the Action Plan for this Unit.

Data Collection and Reporting—Page 8

Data Collection and Reporting Review and Worksheet

This Unit emphasized the importance of using data to make decisions about operating the water treatment plant, how to create forms to easily collect and analyze data, and how to report data to regulatory and decision making bodies.

Worksheet

1. True or False: Every temperature gauge, water meter, dial, pressure gauge, etc... in the water treatment plant should be read and recorded daily.
2. True or False: Once the operating data has been recorded and analyzed for trends, the data sheets can be thrown away.
3. True or False: There is no need to read the electric meter since the electric utility does it anyway.
4. An increase in the amount of water recorded on the daily water meter readings over time might indicate which of the following:
 - a. A leak in the water distribution system
 - b. Increased water usage in the community
 - c. Increased revenue for the water utility if it charges for water by the gallon
 - d. More chemicals may be needed to treat the additional water

Data

Action Plan

Write down at least one thing (and no more than three) that you learned this lesson (Data Collection and Reporting) that could be done in your community.

1. _____

2. _____

3. _____

Instructor's Notes
Data Collection and Reporting—Page 9
Daily Routine Data Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank Daily Routine Data form can be used in most rural water utilities in Alaska.
3. This form is good for a whole month's worth of daily readings. Write the title of the reading you want to record in the top line. See the Daily Routine Data form on Page 3-5 for an example of how to fill out the form.
4. Create titles for items that are appropriate for your own water treatment plant.
5. This form has 15 columns for entering or calculating data. If you have more information that you need to record or calculate, use an additional copy of the form.

Instructor's Notes
Data Collection and Reporting—Page 10
Non-Routine Data Blank Form (Pump Data)

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank pump history form is an example of a non-routine data form. It can be used in most rural water utilities in Alaska.
3. This form can record three sets of pump voltage and amperage readings. These readings may be taken once a year, once a quarter, once a month, or how ever often the operator thinks that it is necessary.

Data

Pump History Data Collection Form

Date: / /	Operator: _____
Time: : am/pm	Pump
Discharge Pressure: _____ psi	<input type="checkbox"/> Well pump No. 1
Flow rate: _____ gpm	<input type="checkbox"/> Well pump No. 2
	<input type="checkbox"/> Pressure pump No. 1
	<input type="checkbox"/> Pressure pump No. 2
	<input type="checkbox"/> Backwash pump

Voltage Leads 1-3	Voltage Leads 1-2	Voltage Leads 2-3	Amperage Lead 1	Amperage Lead 2	Amperage Lead 3

Date: / /	Operator: _____
Time: : am/pm	Pump
Discharge Pressure: _____ psi	<input type="checkbox"/> Well pump No. 1
Flow rate: _____ gpm	<input type="checkbox"/> Well pump No. 2
	<input type="checkbox"/> Pressure pump No. 1
	<input type="checkbox"/> Pressure pump No. 2
	<input type="checkbox"/> Backwash pump

Voltage Leads 1-3	Voltage Leads 1-2	Voltage Leads 2-3	Amperage Lead 1	Amperage Lead 2	Amperage Lead 3

Date: / /	Operator: _____
Time: : am/pm	Pump
Discharge Pressure: _____ psi	<input type="checkbox"/> Well pump No. 1
Flow rate: _____ gpm	<input type="checkbox"/> Well pump No. 2
	<input type="checkbox"/> Pressure pump No. 1
	<input type="checkbox"/> Pressure pump No. 2
	<input type="checkbox"/> Backwash pump

Voltage Leads 1-3	Voltage Leads 1-2	Voltage Leads 2-3	Amperage Lead 1	Amperage Lead 2	Amperage Lead 3

Instructor's Notes
Data Collection and Reporting—Page 11
Monthly Report Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank monthly report form will probably not meet the needs of most rural water utilities in Alaska, but it is provided so that those that want to use it can.
3. This form is used for the manager or the operator to inform the governing council about the current status of the utility. The form contains information on operations, such as how much water was treated at the water plant; information on personnel usage; financial information; and pending work and problems that arose.
4. This form can be used as a guide for the type of information that a manger would want to report to the Council.

_____, Alaska
Monthly Water Utility Report

For Month of _____, 20____

Prepared by_____

Operating Information:

Water treated: _____ gallons
Average daily water use: _____ GPD

Electricity used : _____ KWH
Average daily electric use: _____ KWH/day

Fuel Oil used: _____ gallons
Average daily fuel use: _____ GPD

Chlorine residual high: _____ Mg/l

Chlorine residual low: _____ Mg/l

Regulatory information submitted:

Operator report YES or NO
Bacteria water test sample YES or NO
Other samples submitted:

Personnel Information:

Utility Manager:	_____	hours
Water operator:	_____	hours
Laundry attendant:	_____	hours
Extra labor:	_____	hours
Other:	_____	hours

Financial Information:

Laundry revenue:	\$
Piped water revenue:	\$
Hauled water revenue:	\$
Other revenue:	\$
Total revenue this month:	\$

Labor expense:	\$
Electricity expense:	\$
Fuel oil expense:	\$
Other expense:	\$
Total expense this month:	\$

Work orders postponed or pending completion:	Trouble tickets noted this month:
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Unit 4

Public Relations

Public
Relations

Instructor's Notes

Public Relations—Unit Overview

Instructor class preparation

1. This unit has three exercises. Become familiar with them before the class and make sure you have all your materials and copies made.
2. If you are short on time, look back at the self assessments to try and determine which part of this lesson to spend more time on. The CCR's are important because they are required by law, but many of the experienced managers will be familiar with them by now, and may want to spend more time on Trouble Tickets or community outreach.

Proposed Length: 4 hours

Schedule:

• Public Relations	10 min
• Staff Meetings	15 min
• Exercise 4-1 CCR review	20 min
• CCRs	15 min
• Exercise 4-2 Write a CCR	60 min
• Break	10 min
• Trouble Tickets	20 min
• Exercise 4-3 Customer suggestions	30 min
• Community Outreach	30 min
• Review/Worksheet/Action Plan	30 min

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Helpful References to have on hand

- EPA, Preparing Your Drinking Water Consumer Confidence Report, March 1999
- ADEC, Consumer Confidence Report Rule, www.state.ak.us/dec/water/ccr.pdf

Public Relations

Speaker Notes

Slide 4-1

1. Start off by explaining that the GOAL of this lesson is **better communication and understanding between the utility and the customer**.
2. Review approximately how much time we plan to spend on this lesson, how much time you think you will spend on the exercises, and agree with the group on when you will take the next break (and for how long).
3. Review the key concepts that should be covered in this lesson.
4. Review the key terms to watch out for.



Public Relations—Page 1

Learning Objectives

The goal of this lesson is to emphasize the importance of communication and cooperation between members of your community and the employees of your water utility. In order to ensure sustainable long-range operations and planning, the vision of the village community must be balanced with that of the water utility.

By gaining the support, feedback, and cooperation of your community members you can identify problems before they grow worse; reduce your operating costs; and provide better service at the same time. Additionally you will enjoy your work more as people will be smiling about utility issues, instead of growling about them.

Key Concepts to Learn

After completing this lesson, you should be able to:

- Understand the importance of a regular staff meeting.
- Understand Consumer Confidence Reports and their importance.
- Develop your own system of using Trouble Tickets to track and record problems, as well as follow-up contacts to inform your community about the efforts being made to solve them.
- Brainstorm ways to educate and involve your community.
- Anticipate troubles and disparities between members of your community and the utility.
- Create opportunities and roles within the community for people to become more active and share insights.

Key Terms to Know

- CCR: Consumer Confidence Report
- Surface Water
- Ground Water
- Data dump
- Educational Statement
- Health Effects Language
- MCL: Maximum Contaminant Level
- MCLG: Maximum Contaminant Level Goal
- AL: Action Level
- TT: Treatment Technique
- ppb: Parts per billion
- Waiver
- Violation
- Trouble Ticket
- Community Outreach

Public Relations

Topics for this Unit

- **Staff Meetings**
- **Consumer Confidence Reports**
- **Trouble Tickets**
- **Community Outreach**

11/18/2003
Alaska Department of Community and Economic Development
Operational Management 4-1

Public Relations

References used to develop this Unit

- EPA, Preparing Your Drinking Water Consumer Confidence Report, March 1999
- ADEC, Consumer Confidence Report Rule, www.state.ak.us/dec/water/ccr.pdf
- Utility Management, First Edition, California State University, College of Engineering and Computer Science, Office of Water Programs, 2001
- Basic Management Principles for Small Water Systems, An AWWA Small-Systems Resource Book, American Water Works Association, 1982

Instructor's Notes

Public Relations—Page 2

Speaker Notes

Slide 4-2

Discuss what Public Relations means

Discuss why Public Relations is important

- Provide some short examples like those in the text.

Discuss how to manage public relations

- Key is getting the staff involved, and letting them know how important P.R. is
- Use tools available
 - Staff
 - CCRs
 - Trouble Tickets
 - And other outreach



Slide 4-3

Discuss why staff meetings are important

- Keep all staff informed and up to date so they know what is happening at the utility
 - Way to get staff involved in all aspects of the utility
 - Safety
 - Scheduling Work
 - Data Collection
 - P.R.
 - Inventory Control
 - And Contingency Planning
- For example

Discuss how to make a staff meeting successful

- Keep it short and to the agenda



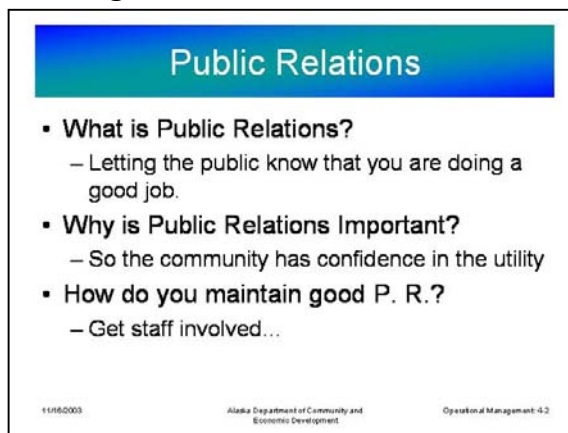
Public Relations—Page 2

What is Public Relations?

Public relations is the process of building a good reputation by letting people know about the work being done and the goals being reached.

Why is Public Relations important for a utility?

Just about everything any staff member from the utility does has an effect on how the community views the utility and the services it provides. If a staff member argues with an irate customer, then word will get around that the utility is “not cooperative”. If a well pump fails and water is not available for a day, then the “utility does not know what they are doing.” It is not enough for the staff to do a good job. The utility has to let the community know that they are doing a good job.



Public Relations

- **What is Public Relations?**
 - Letting the public know that you are doing a good job.
- **Why is Public Relations Important?**
 - So the community has confidence in the utility
- **How do you maintain good P. R.?**
 - Get staff involved...

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How do I manage Public Relations to best benefit the utility?

Public relations is all about communication, and good communication is two way, both sending a message, and receiving replies. The utility has several methods available to communicate with the public. These methods include the utility staff, Consumer Confidence Reports, listening to and responding to customer complaints (trouble tickets), and developing other community outreach programs.

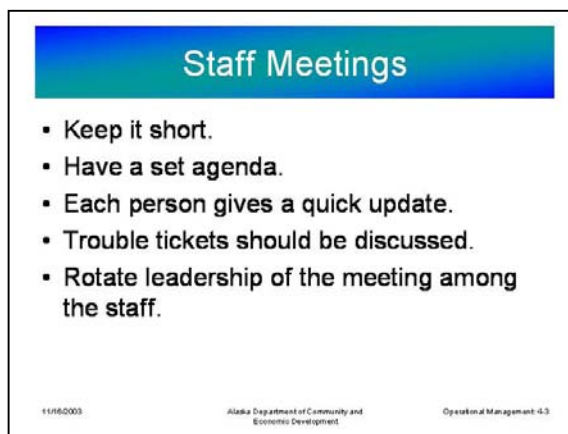
Staff Meetings

To manage good communication with the public, start with managing good communications with your staff. It is essential that all utility staff understand what is happening at the utility (such as what the financial situation is, how seriously safety is taken, how important customer feedback is) so that everyone at the utility provides the public with the same message. One of the best methods for developing good communication with the staff is through a regularly scheduled weekly staff meeting.

Tips for conducting a successful regularly scheduled staff meeting:

- Keep it short (between 15 and 30 minutes) so that people will not want to skip it (it also emphasizes that you realize that their time is valuable).
- Have a set agenda.
 - Each person (or department) should give a quick update of new developments or needs for the week
 - The manager should let the staff know how the budget is doing
 - Work Orders should be assigned
 - Trouble tickets should be discussed
- Rotate leadership of the meeting among the staff.

A sample meeting form is on the next page.



Staff Meetings

- **Keep it short.**
- **Have a set agenda.**
- **Each person gives a quick update.**
- **Trouble tickets should be discussed.**
- **Rotate leadership of the meeting among the staff.**

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Instructor's Notes

Public Relations—Page 3

Speaker Notes

Example Weekly Staff Meeting

Review the Example on the opposite page with the participants.

Ask the participants if they have weekly staff meetings at their utility?

Are the staff meetings looked at as something that is required, and that they would rather not be there, or is it something useful?

What are ways they would improve their own staff meetings?

Public Relations—Page 3

Example Weekly Staff Meeting Minutes Form

Weekly Staff Meeting for Blue River Water and Sewer Utility

Reminder: Meeting should not exceed 20 minutes (put off detailed discussions to later specially arranged meetings)

Purpose: To improve communications among utility staff.

Date: *Wed 2/25* meeting start time: *8:33am* end time: *8:56am*

Circle names of the staff members who are present at the meeting:

Manager

Minnie Strator

Primary Operator

O. Perator

Backup Operator

Onn Kahl

Attendant

Luvy Tcleen

Attendant

Sparkly White

1. Manager's Update: (policy, revenue, expenditures, etc.)

Revenue last week: *Received lot's of monthly bills ~ \$2,300; then \$815.50 in coin-op.*

Trouble Tickets: *None this week.*

Other issues: *Received a letter from ADEC with the annual monitoring summary. Looks like we have to have a sanitary survey done this year. I'll call the Tribal Health Corp and see when they are available.*

We also need to review the safety policy and update the hazard assessment this week.

2. Operator's Update: (general operation and maintenance)

Gallons water produced last week: *15, 540 gallons*

Gallons of water in storage: *82,000 gallons*

Gallons of fuel used last week: *150 gallons*

Gallons of fuel in storage: *3,240 gallons*

Water sampling: *none last week, will take annual nitrate sample this week*

Other issues: *It is supposed to get cold this week, so O. is checking the well twice a day.*

3. Attendant's Update: (general conditions)

Someone vandalized one of the men's restroom stalls again.

Women's shower got plugged up last night.

We need to order another mop, the one we have is getting old.

Luvy wants to go on vacation next week.

4. Other Issues:

5. Topics for after the staff meeting: (issues that need to have a separate meeting scheduled for a later time including relevant individuals)

We'll all meet at 1pm to revise the hazard assessment.

Instructor's Notes

Public Relations—Page 4

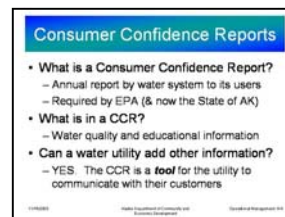
Instructor class preparation

- Decide ahead of time whether the goal of this lesson is to introduce the CCR concept, or to go ahead and practice writing a CCR. If you are going to write a CCR, you will need the information on the water system ahead of time.
- Inform the participants of the many formats and ways to write CCRs: by hand, on computer (Word, Publisher), or using the CCR Writer Software.
- If you are going to practice writing CCRs with a computer, you will need computers for all of your students, or one for each group.

Materials Needed

Exercise materials:

1. Sample CCR's from a local water utility (Anchorage, Fairbanks, and Juneau's can be found on-line).



Speaker Notes

Exercise 4-1

1. Begin class by passing out CCRs from a local utility (or from anywhere; many water utilities have their CCRs posted on-line).
2. Have the class examine the CCRs for a few minutes
3. Ask the class what they can learn about the water and the local utility from the CCR.
4. List the classes responses on the flip chart or overhead slide.
5. Once the class has exhausted their ideas for what they can learn from the CCRs, ease into the lecture/discussion described below.

Slide 4-4

1. Briefly discuss the rationale behind CCRs:
 - They are a provision of the Safe Drinking Water Act (SDWA) amended in 1996.
 - Consumers have the right to know what is in their drinking water and where that water comes from.
 - Educated consumers are more likely to help protect their drinking water sources and to understand the true costs of safe drinking water.
 - State of Alaska received primacy over this rule in 2001. This means that as of 2001, the State has to enforce the rule.
2. Discuss what a CCR is and what it is not:
 - IS a brief annual water quality report (2-4 pages) using existing monitoring data. No new monitoring required just for the CCR.
 - IS NOT a report from the lab that you send your customers. YOU have to write this.
 - CAN BE very simple. Try to keep it that way.

3. Discuss who must prepare CCRs:
 - Every Class A community water system in Alaska (15 or more service connections, or 25 or more non-transient people using the system).
 - This includes water haul systems that distribute water to customers even though they do not treat the water themselves
4. Discuss when to distribute the report:
 - By July 1 for the previous year.
 - A copy must be provided to every consumer (some exceptions for small communities.)
 - A copy has to be sent to ADEC
5. Discuss the content required in the CCR: some items are content suggestions, some paragraphs and definitions have to be word for word. The content includes:
 - Water system information: names/contacts
 - Drinking water source
 - Definitions
 - Water source assessment information (when it becomes available from the state).
 - Detected contaminants, likely source & potential health effects.
 - Compliance with regulations (explanation of any violations)
 - Required educational statements
 - EPA contact information
6. Emphasize that the CCR is a *tool* for the utility to communicate with the community about the good job it is doing protecting the public health.

Public Relations—Page 4

Consumer Confidence Reports

The Environmental Protection Agency, or EPA, has established citizen “Right to Know” programs which allow public access to information concerning public health.

What are Consumer Confidence Reports?

CCRs are annual reports utilities make to the public, required as a part of the EPA’s citizen protection plan.

Each year, water utility programs are required to provide citizens with a report on the state of their drinking water. These reports must include information concerning the source, treatments, and quality of their water. These reports include a summary of the pollution testing data collected over the course of the year, letting consumers know the maximum-recorded levels of any pollutants found in the system.

The format for CCRs can range from charts and listings of technical data, to interactive Internet sites and informative pamphlets. Clear and useful information makes CCRs an invaluable tool. Developing functional and informative CCRs helps everyone in your community to be knowledgeable and aware. Information concerning maximum levels that the public may be exposed to and the effects such exposure can have are useful elements to include.

Try to think of CCRs not simply as a requirement from the government, but as a tool: *your* tool to talk with everyone in town at once. With little background in water contaminants, plain data readouts can be overwhelming and meaningless to consumers. Your CCR should include supporting information that explains things in plain language for your customers. Tell them what you are working on, what some of the goals are for your utility, why you have such goals, and how they can help you to achieve them.

Follow CCR mailings and public postings with community surveys, to see what people thought of them, and what you might add to the next CCR to make it more useful to your community. An educated and informed community can help maintain a clean water source. Knowing about the water source and area contaminants are key in preventing disasters of water contamination, and both citizens and your staff are a key to this. As you identify community patterns that threaten your water sources, use your CCRs to educate everyone on how they can help change those patterns.

The CCR is your tool to communicate with your community. Use it.

Consumer Confidence Reports

- **What is a Consumer Confidence Report?**
 - Annual report by water system to its users
 - Required by EPA (& now the State of AK)
- **What is in a CCR?**
 - Water quality and educational information
- **Can a water utility add other information?**
 - YES. The CCR is a **tool** for the utility to communicate with their customers

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Operational Management 4-6

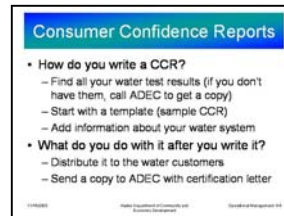
Instructor's Notes

Public Relations—Page 5

Speaker Notes

Slide 4-5

1. Point out the steps to take to write a CCR.
2. Discuss what to do with the CCR once it is written.
3. Look at the sample CCR on the following two pages in the student manual. Discuss how simple and short it is while still containing all the required information.



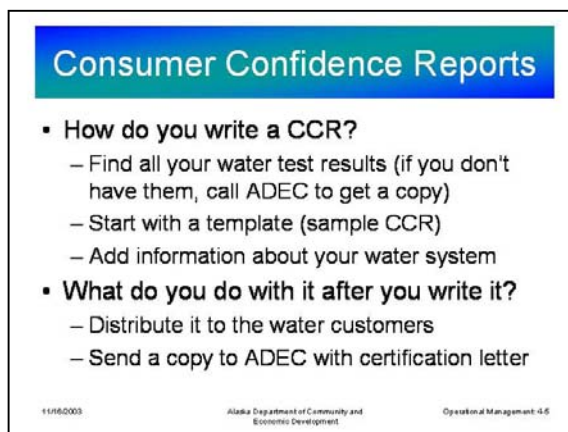
Ideas for Real Life Examples & Potential Discussion Questions

1. What is missing from the sample CCR that could have been included ? (How much water is produced annually, monthly or daily; how much money it costs to make the water safe to drink; how much money is invested in all the water treatment plant equipment; staff introductions; etc....)
2. Your water tests show that your utility has had MCL levels higher than the maximum allowed. How do you explain that in your CCR so that people do not panic? Who can help you in dealing with this sort of situation
3. Brainstorm ways in which CCR's can become more than mass mailings and posted bulletins.

Public Relations—Page 5

How do you go about writing your first CCR?

1. First you need to gather together your water test results from the lab. Since some tests are conducted less frequently, you may have to find results from previous years. If you cannot find any of your test results, call ADEC and ask them to send you a copy.
2. Review all your correspondence from ADEC to see if the water utility has any violations (look for your annual Monitoring Summary from ADEC).
3. Make sure you know some details about your water system, like where your water comes from and whether it is *surface water* or *ground water*.
4. Decide if there is anything about you water system that you would like to communicate to your customers. This may be a good time to let people know about good things that happened last year, like welcoming new staff, announcing awards, or telling about water system expansion construction.
5. Decide how you want to draft your report. Options include filling out a pre-made form (see sample in Appendix 4), modifying a template created on a computer, using EPA Software CCRWriter v1.5, or creating your own report by other means. If you have a computer and are comfortable using it, modifying the template may be the easiest way to create a legible report that you can distribute to your users. If you do not like using computers, then filling out the form may be easier.



A sample CCR is shown on the next two pages.

A blank CCR form is provided at the end of this Unit. This form will meet the needs of most rural water utilities in Alaska, but will NOT fit every need. For instance, if you need more room to fill out the violations section or health effects section, you may have to add an additional sheet. Consult the CCR manual from EPA or contact ADEC for the exact health effects language to use for a particular contaminant. Also there are special paragraphs that are required if arsenic, nitrates, lead, cryptosporidium, or radon are detected.

What do you do with the CCR after you write it?

You have to distribute the report to the water system users. If you have a piped or hauled water system, include the report in one of the monthly bills. If you have a community watering point, post the report at the watering point.

You must also send a copy of the report to ADEC along with a certification letter stating that you distributed the report to your customers.

Once you have distributed the report you are done! (until next year)

I have to write this report again next year? Yes. But it should be very easy. The report will be the same except for any new water test results that have been conducted within the last year or any new violations.

Instructor's Notes

Public Relations—Page 6

Speaker Notes

CCR Example

1. The sample CCR on the opposite page is an example from one drafted by the ADEC and can be found on their web page.
2. This sample CCR shows how simple a CCR can be. It is only two pages long. All of the required information is there.
3. Review what kind of information is found on the sample CCR (the numbered items in the box on the right of the page).

Ideas for Real Life Examples & Potential Discussion Questions

1. What is missing from the sample CCR that could have been included ? (How much water is produced annually, monthly or daily; how much money it costs to make the water safe to drink; how much money is invested in all the water treatment plant equipment; staff introductions; etc....)

Public Relations—Page 6

CCR Example*

Village of Rocky Point Water Quality Report for 2000

We're very pleased to provide you with this year's Water Quality Report. We want to keep you informed about the water and services we have delivered to you over the past year. Our goal is to provide to you a safe and dependable supply of drinking water. Distributing this report is a new, annual federal requirement.

Our present source is ❶ *surface water from Goldpan Creek*. There is a project in progress to upgrade the water system and its source. If you have any questions about this report or your water utility, please contact ❷ *John Doe at (907) 555-5555*.

The Rocky Point Public Water System monitors your drinking water for contaminants according to Federal and State laws. The table on the next page shows that all of our monitoring between ❸ January 1 and December 31, 2000, (or the most recent test where noted), found that your drinking

❹ Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. Guidelines on reducing the risk of infection from microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

meets or exceeds all Federal and State standards.

As water travels over the land or underground, it can pick up substances or contaminants such as microbes, inorganic and organic chemicals and radioactive substances. We test the water to check for contamination that could be found in water, including:

- Microbiological contamination, such as viruses and bacteria, which may come from septic tanks, sewage treatment, and wildlife;
- Inorganic Contaminants, such as salts and metals, which can be naturally occurring or the result of stormwater runoff;
- Organic chemical contaminants, which can include fuel products; and
- Radioactive contaminants, from naturally occurring deposits.

❺ All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily pose a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800 426-4791.

❶ **Source of water:**
type, name, and
location of water
source(s)

❷ **Name/phone** of
contact person.

❸ Use calendar year
data from previous
calendar year.

❹ Educational
Statements. **The rule
requires these to be
included** in exactly
these words.

❺ The report must
contain basic
information about
drinking water
contaminants. Use
this language or write
equivalent material
that better fits your
specific local
situation.

❻ Educational
statements. **The Rule
requires these to be
included** in exactly
these words.

Public
Relations

Instructor's Notes

Public Relations—Page 7

Speaker Notes

CCR Example

1. The sample CCR on the opposite page is an example from one drafted by the ADEC and can be found on their web page.
2. This sample CCR shows how simple a CCR can be. It is only two pages long. All of the required information is there.
3. Review what kind of information is found on the sample CCR (the numbered items in the box on the right of the page).
4. Review definitions for:
 - MCLG
 - MCL
 - AL
 - TT
 - ppb
 - ppm
5. Review meaning of violation and waiver

Ideas for Real Life Examples & Potential Discussion Questions

1. What is missing from the sample CCR that could have been included ? (How much water is produced annually, monthly or daily; how much money it costs to make the water safe to drink; how much money is invested in all the water treatment plant equipment; staff introductions; etc....)

Exercise 4-2

Materials Needed

- Water test results for the students' water systems or photocopies of the Blue River Water System data from the instructor's manual and photocopies of completed Blue River Water System CCR for 2005.
- Computer(s) for the student(s), MSWord CCR template or CCR Writer Software; or photocopies of CCR form from student manual

Write a CCR using one of the following 2 methods:

1. Have the student(s) complete a CCR for their utility for the past year using real water system data. Either use the template provided on disk and write the CCR with a computer, use the CCR Writer program, or fill in the blanks on the form provided at the end of this Unit. Add pages to the form when necessary.
2. It is June of 2006 and CCRs are due at the end of the month. Have the student(s) complete a practice CCR for the Blue River Water System for the year 2005. Use the form provided at the end of the Unit and the water system data for the year 2005 provided on page 2 & 3 of the exercise. Pg 4 & 5 provides an answer.

Public Relations—Page 7

CCR Example continued

Rocky Point Water Quality Report for 2000 page 2

We test for regulated contaminants. The table shows the only ones detected at any level. This table shows all testing completed between ⑨January 1 and December 3, 2000 (or the most recent test where noted), found that your drinking meets or exceeds all Federal and State standards.

⑦Contaminant	Level Detected	Units Measured In	MCLG	MCL	Likely Source of Contamination
Inorganic Contaminants					
Nitrate (1999)	0.1	ppm	10	10	Erosion of natural deposits or sewage
Fluoride (1994)	1.2	ppm	4	4	Erosion of natural deposits
Copper (1995)**	2.0	ppm	AL=1.3 ppm; three of 10 samples were over 1.3		Corrosion of indoor plumbing
Lead (1995)	9.8	ppb	AL=15ppb; one of ten samples was 15 ppb		Corrosion of indoor plumbing
Organic Contaminants					
Coliform	1	-	0	One positive sample per month	Naturally present in the environment
Turbidity	2 (range 0-4)	NTU	-	TT	Soil runoff

⑧**MCL (Maximum Contaminant Level)** means the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available technology.

⑧**MCLG (Maximum Contaminant Level Goal)** Means the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

⑨**AL (Action Level)** means the concentration of a contaminant, which, if exceeded triggers treatment or other requirements which a water system must follow.

⑨**TT (Treatment Technique)** is a required process intended to reduce the level of a contaminant in drinking water.

⑧**ppb** means parts per billion

⑧**ppm** means parts per million

Information about regulatory violations

⑩All of our testing shows that the water meets State and Federal regulations for drinking water quality. Three regulatory violations were for these delayed or missing tests: 1) the monthly test for coliform bacteria in September 2000; 2) The test for thallium, nickel, cyanide, beryllium, and antimony was due December 1999 but not done until August 2000; and 3) not testing turbidity in January 2000. The health affects of these delayed tests are unknown.

****About our Copper Level:** Copper is an essential nutrient, but some people who drink water that contains copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

⑦Table of Contaminants. If the contaminant was found on the most recent test, report it. Consider a five year period in looking for the most recent test.

**Wherever the level found exceed the AL or MCL, include health effects language. Call the SDWA Hotline or your ADEC Drinking Water Specialist for the correct wording.

⑧Every CCR must include definitions of key terms that consumers will need to understand the contaminant data. You must use the definitions listed here for MCL and MCLG.

⑨Include these definitions if your report contains information on a detected contaminant that is regulated by an AL or TT.

⑩If your water system violated the monitoring and reporting of compliance data during the year covered by the report, your CCR must describe the violation.

Instructor Notes

Public Relations—Page 8

Instructor class preparation

There is one exercise prepared for the section. If you plan to do this exercise, be sure to have copies of the “customer suggestion” form available, and something picked out for a customer suggestion box.

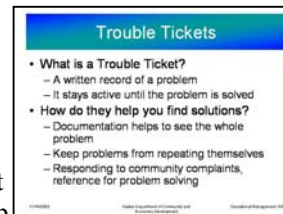
Materials Needed

1. Customer suggestion form
2. Customer suggestion box (paper bag?)

Speaker Notes

Slide 4-6

1. Start this section by reading the short story that is at the bottom of the next page out loud to the class.
2. Ask them “If they were the utility manager, what would they do in this situation?”
3. Explain that the goal of this section is not just documentation of problems, but emphasizing the importance of responding to the community and following-up on suggestions or complaints.
4. Pay special attention to the follow-up process of:
 - Informing the staff of the problem and what action was taken (at weekly staff meeting)
 - Informing the person who first made note of the problem that some action was taken (with a phone call, or better yet, a letter)
 - Reporting to your council (at monthly council meeting or in monthly report)
5. Everyone has a unique perspective, all views combine into a vision, try not to second guess people’s observations. Every incident deserves investigation.



Ideas for Real Life Examples & Potential Discussion Questions

1. Relate an example where a community member’s observation proved crucial.
2. Your utility is being bombarded with comments and complaints from members of your community. You find that much of it is based on a lack of understanding. Discuss ways to address community concerns and further educate people in the necessary areas.
3. Brainstorm problem scenarios that your utility could face. Imagine the different players involved in the scenario. Have the students break into small groups and role-play, sharing their observations and trouble tickets with the class afterwards.
4. Could keeping trouble ticket records help you in the event of a lawsuit? Why or why not?
5. In the reviewing, assessment, and completion processes of Trouble Tickets, does a neutral party or facilitator need to be employed?
6. Do comments or complaints heard in passing at the post office warrant a Trouble Ticket? How about a hushed conversation during a refreshment break at a village council meeting?
7. How can you encourage members of your community to comment without being overwhelmed with unnecessary paperwork? Can you let others fill out part of the trouble ticket?
8. What kind of response systems would work for your community? What would make the public comfortable and confident enough to share?

Public Relations—Page 8

Trouble Tickets

How many times have you found that you repeated the same problem, without noticing the reoccurrence, or learning from your past mistake? Or that you forgot to solve a problem until something drastic reminds you to?

Imagine that you documented every trouble, mistake or complaint in your life. Would it have an effect on your performance? Often times when problems are laid out clearly before us, we save ourselves from worsening or repeating the same mistake.

When do you use Trouble Tickets? Trouble Tickets are written records designed to document all information concerning a problem, and what you are doing to solve it. You use them whenever new operations or maintenance problems are identified.

If a citizen phones your office to tell you they think one of your pipes is rusting apart: You should ask them to hold on, grab a blank trouble ticket, and fill it out while you talk with them. Or, if one of your operators notices a leaky valve: they should fill out a trouble ticket, describing the who/what/where/when of the problem. For non-emergencies they can't fix on the spot without disrupting their regular schedule, they should give it to you for scheduling.

In both of these cases, once you have a trouble ticket, you will need to determine the priority for the item, and schedule attention to the issue into your operators' workplan. As the problem is addressed, anything done to address it should be noted on the ticket. When the problem has been solved, or when you ascertain it can not be solved, it is almost time to close the ticket and file it away into the "solved tickets" file for that month. First, however, you must make sure to share the fact that the problem was solved with whoever was helpful enough to alert you to it, and thank them for bringing the problem to your attention. You may choose to send a letter, make a call, or send a copy of the ticket itself. You could even offer awards for people who flag the most problems.

Trouble tickets can begin as a file of index cards, overviewed at every utility and community meeting. They can also expand upon themselves and become the seed for a maintenance management plan, or an inventory project. The troubles addressed within each ticket are not to be looked upon once, but instead, integrated into a program where they are investigated and later responded to.

Trouble Tickets

- **What is a Trouble Ticket?**
 - A written record of a problem
 - It stays active until the problem is solved
- **How do they help you find solutions?**
 - Documentation helps to see the whole problem
 - Keep problems from repeating themselves
 - Responding to community complaints, reference for problem solving

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Operational Management-4.6

Example Trouble Ticket

Wanda U. Manager, the tribal administrator of the village of Blue River, Alaska, (and by default, the Water Utility Manager, since she supervises the Water Plant Operator, and keeps the books for the washeteria), was in the Blue River Post Office getting the mail for the Tribal Council when she overheard two people talking about the washeteria. They were saying how they hated going there lately because the showers were getting very dirty, and there was never any toilet paper. Wanda didn't approach them, because it would have been rude to interrupt their conversation, so she went back to her office.

If you were Wanda, what would you do next?

Instructor's Notes

Public Relations—Page 9

Speaker Notes

Trouble Ticket Example

1. Review how the Wanda, the utility manager from the story on the previous page made use of the trouble ticket form.
2. Did she get all the information correct?
3. What does it look like she did to follow-up?
4. How could the manager improve this process?

Exercise 4-3

Materials Needed

- Blank paper to use as “customer Suggestion forms”
- Customer “Suggestion Box” (Paper Bag?)

Instructions

1. Pass out the “customer suggestion” forms
2. Ask the students to make some comments on the forms (could be about anything, the class, their rooms, their utility, etc.)
3. Turn in the comment forms into the suggestion box.
4. Take turns having someone pick one of the comments out of the bag, and read it to the class.
5. Discuss how best to address the comment.

Public Relations—Page 9	
TROUBLE TICKET	
Date: 6/31/2005	Time: 1:00 pm
Name of person completing form: Wanda U. Manager	
Name of person who noted problem:	Contact Information
Overheard in the Post Office	Phone#: N/A
	Address: N/A
<p>Problem Description (when, where, what):</p> <p>Date: 6/31/2005</p> <p>Location: Washeteria</p> <p>Problem:</p> <p>Overhead conversation about how dirty the showers in the washeteria are and that there is no toilet paper in the stalls.</p>	
<p>Utilities response given to the person who noted problem:</p> <p>Did not approach people in the Post Office because it would have been rude to interrupt their conversation.</p>	
<p>Action taken to correct problem (when, where, what)</p> <p>Date: 6/31/2005 12:45 pm</p> <p>Location: Washeteria</p> <p>Action:</p> <p>Inspected the showers and the stalls in both the mens' and womens' restrooms.</p> <p>Showers were very clean, and all stalls had plenty of toilet paper.</p>	
<p>Follow Up</p> <p>Discussed Trouble Ticket at Staff Meeting <input checked="" type="checkbox"/> staff knows to clean showers</p> <p>Informed person who noted problem of the Action Taken <input type="checkbox"/> N/A</p> <p>Include Trouble Ticket Summary in Monthly Report to Council <input checked="" type="checkbox"/> Noted in monthly report</p>	

Instructor's Notes

Public Relations—Page 10

Speaker Notes

Slide 4-7

1. The goal of this lesson is to bring to light ways for the utility to improve communication and involvement with the community.
2. Start the lesson with a discussion on community outreach by asking the participants if their utilities are involved in any kind of community outreach (public meetings, etc)? Why or why not? Do they consider the outreach successful? Is there any value in doing community outreach?
3. Review the traits of a good public meeting.
4. Review methods to get schools and youth involved with the utility.
5. Review other methods for communicating with the public.
6. Discuss having an open house for the utility.



Ideas for Real Life Examples & Potential Discussion Questions.

1. Take another look at Consumer Confidence Reports and Trouble Tickets, how can they help in community outreach?
2. Identify a community that has good community outreach and share how that strengthened the utility.
3. Offer kids classroom rewards for their involvement and awards to adults for community achievements. Recognition stands alone as an effective award for those programs on tight budgets.
4. What environments are conducive to commentary? Are your current meetings set up in a way that promotes involvement? Do you have minutes posted or sent out for those that cannot make it in person? Would it be effective in your community to have a "call-in" question/comment portion of your meetings?
5. Do any of you come from communities that want to dramatically improve your water treatment or distribution systems? Are there others of you that come from communities where only small technical adjustments need to be made? Does it seem as if community outreach would be helpful in both cases?
6. If you held a public tour of your utility, what would you show people?

Public Relations—Page 10

Community Outreach

Successful programs become that way through committed participants, good follow through, and a broad base of support.

Mastering the public meeting is one way to both engage and inform the community. Taking care not to schedule events on conflicting nights, and paying attention to community patterns will help in optimum scheduling, and high turnouts. Make sure to clearly post meeting time and place, taking advantage of bill mail-outs, central community kiosks, newsletters and radio stations. Whenever possible, invite people yourself; don't underestimate the power of personal invitations!

Community Outreach

- **Master the public meeting**
 - Have opening and closing ceremonies
 - Invite keynote guests
 - Make it a potluck or theme night
- **Involve schools and youth: offer tours, field trips**
- **Present information in various ways**
- **Hold an open house**

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Operational Management-4.7

Involve the schools, and integrate community outreach programs into class curriculums. Have your utility offer tours and field trips to your local school kids. Make youth taskforces where kids keep their eyes out for trouble, and observe their families' practices at home. Create positions on your community board and committees for interested and capable high school students. Offer work-experience programs and internships wherever possible.

Use as many different forms of communication media as you find necessary. If you can, explore the Internet and bookmark useful sites. Seek out other communities and visit their programs or correspond and share ideas. Employ local artisans to incorporate their talents into your outreach programs, whether it is opening the meetings with a dance or concert recital, or designing the art for flyers, which you will insert with bills.

Create community kiosks solely dedicated to public health and community utility issues; make sure they are in centralized and well-frequented locations. Include photos, blueprints and aerial maps; have reference persons and numbers posted alongside.

Hold an open house. Have a community gathering with quality information and stylish presentation. Invite everyone to come participate. Spend time planning and brainstorming ways to make the event a success. Follow up with pictures and thank you notes to sponsors and volunteers. Make it a regular thing, even if but once or twice a year. Make your utility site a familiar and welcome spot.

Instructor's Notes

Public Relations—Page 11

Speaker Notes

Public Relations Review and Worksheets

1. Review what was covered in this Unit on Public Relations
2. Review the Key Concepts and Key Terms at the beginning of the Unit, and ask if there are any questions.
3. Begin work on the worksheet. The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion.

Worksheet Answers

1. True or **False**: Consumer Confidence Reports describing the quality of the drinking water in a community are required by law to be mailed to each customer of water utility every month.

CCRs are only required to be distributed annually, and do not necessarily have to be mailed to customers. It depends on the size of the community and the number of customers whether or not they have to be mailed.

2. True or **False**: The State of Alaska Department of Environmental Conservation automatically sends the utility all of the data that is needed to include in the Consumer Confidence Report.

At the present time (summer 2003) the ADEC does not automatically send every water system their test result data. ADEC expects every water utility to maintain those records. If the utility needs copies then they can request them from ADEC.

3. True or **False**: If the utility only had one positive bacteria sample during the year, they do not have to report it on their CCR.

Any positive bacteria results throughout the year should be reported on the CCR, and what steps were taken to correct the positive result, even if it is just one.

4. True or **False**: If your water system uses a well for the drinking water source, and does not chlorinate, then the utility does not have to do a CCR.

Every water system has to do a CCR, even if they do not chlorinate.

5. True or **False**: Trouble tickets are required by the State of Alaska.

Trouble tickets are not required by the State of Alaska. They are a tool for the utility to use to make their organization operate better.

6. True or **False**: Offering door prizes is a bad method to encourage participation at a community meeting.

Offering door prizes is an effective method to get people to attend community meetings.

Action Plans

After doing the worksheet, complete the Action Plan

Public Relations—Page 11

Public Relations review and Worksheet

This goal of this unit was to emphasize the importance of communication and cooperation between members of your community and the employees in the utility, and to highlight several ways to accomplish this. Topics covered were:

- Consumer Confidence Reports (CCR)
- Trouble Tickets
- Community Outreach

What CCRs are, why they are needed, and how they are written was covered. Other items to include in CCRs to enhance communication with the public was discussed. The value of Trouble Tickets and the importance of follow-up were explained. Different methods for getting the community involved in the utility were discussed.

Worksheet

1. True or False: Consumer Confidence Reports describing the quality of the drinking water in a community are required by law to be mailed to each customer of water utility every month.
2. True or False: The State of Alaska Department of Environmental Conservation automatically sends the utility all of the data that is needed to include in the Consumer Confidence Report.
3. True or False: If the utility only had one positive bacteria sample during the year, they do not have to report it on their CCR.
4. True or False: If your water system uses a well for the drinking water source, and does not chlorinate, then the utility does not have to do a CCR.
5. True or False: Trouble tickets are required by the State of Alaska.
6. True or False: Offering door prizes is a bad method to encourage participation at a community meeting.

Action Plan

Write down at least one thing (and no more than three) that you learned this lesson (Public Relations) that could be done in your community.

1. _____

2. _____

3. _____

Instructor's Notes
Public Relations—Page 12
Weekly Staff Meeting Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank weekly staff meeting form will probably not meet the needs of most rural water utilities in Alaska, but it is provided so that those that want to use it can.
3. This form is used as the set agenda for the weekly staff meeting. The purpose of the form is to make the meeting go faster (there is no discussion about what the purpose of the meeting is, or how long the meeting will last).

Instructor's Notes
Public Relation—Page 13
CCR Blank Form page 1 of 3

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank CCR form will meet the needs of most rural water utilities in Alaska, but will NOT fit every need. For instance if you need more room to fill out the violations section or health effects section, you may have to add an additional sheet. Consult the CCR manual form EPA or contact ADEC for the exact health effects language to use for a particular contaminant. Also there are special paragraphs that are required if arsenic, nitrates, lead, cryptosporidium, or radon are detected.

Consumer Confidence Report for 20__

We're very pleased to provide you with this year's Water Quality Report. We want to keep you informed about the water and services we have delivered to you over the past year. Our goal is to provide to you a safe and dependable supply of drinking water. Distributing this report is a new, annual federal requirement.

Water System Information

Water System Name:	PWS#:
Address:	
City, State, Zip:	
Contact Person:	Tel#:
Date(s) of Regularly Scheduled meeting(s):	
Population Served:	Number of Connections:
Date of report distribution:	For Calendar Year:

Water Source Information

Ground Water Sources (springs, wells, infiltration galleries)	
Source 1 Name:	Location description:
Source 2 Name:	Location description:
Ground water contamination source(s) (If known):	
Surface Water Sources (lakes, rivers, creeks):	
Source 1 Name:	Location description:
Source 2 Name:	Location description:
Surface water contamination source(s) (if known):	
Source water assessment or protection plan availability:	

Waivers

There are many regulations pertaining to sampling and monitoring of our water system. We did not test for the following contaminants because we had a waiver. These contaminants are very unlikely to occur in our area. The waiver reduces sampling costs for your water utility and saves you money.			
Our utility has a waiver from sampling for (circle those that apply):	Asbestos	Synthetic Organic Contaminants	Other Organic Contaminants
Other waivers:			

Compliance Violations

Treatment Techniques:	Monitoring/Reporting:
Record Keeping:	Special Monitoring Requirements:
Administrative or judicial orders:	
Other or action taken to correct violation:	

Instructor's Notes
Public Relations—Page 14
CCR Blank Form page 2 of 3

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank CCR form will meet the needs of most rural water utilities in Alaska, but will NOT fit every need. For instance if you need more room to fill out the violations section or health effects section, you may have to add an additional sheet. Consult the CCR manual form EPA or contact ADEC for the exact health effects language to use for a particular contaminant. Also there are special paragraphs that are required if arsenic, nitrates, lead, cryptosporidium, or radon are detected.

Water Quality and Health Information

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. Guidelines on reducing the risk of infection from microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

As water travels over the land or underground, it can pick up substances or contaminants such as microbes, inorganic and organic chemicals and radioactive substances. We test the water to check for contamination that could be found in water, including:

- Microbiological contamination, such as viruses and bacteria, which may come from septic tanks, sewage treatment, and wildlife;
- Inorganic Contaminants, such as salts and metals, which can be naturally occurring or the result of storm water runoff;
- Organic chemical contaminants, which can include fuel products; and
- Radioactive contaminants, from naturally occurring deposits.

All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily pose a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800 426-4791.

We monitor your drinking water for contaminants according to Federal and State laws. The table on the next page shows that all of our monitoring for the last calendar year, (or the most recent test where noted), found that your drinking water meets or exceeds all Federal and State standards. The table contains a list of many possible contaminants that can be found in water. Our water did not have all of these contaminants. It only had the contaminants where noted in the "level detected" column.

Definitions

MCL (Maximum Contaminant Level) means the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available technology.	
MCLG (Maximum Contaminant Level Goal) Means the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.	
AL (Action Level) means the concentration of a contaminant, which, if exceeded triggers treatment or other requirements which a water system must follow.	
TT (Treatment Technique) is a required process intended to reduce the level of a contaminant in drinking water.	
ppb means parts per billion	ppm means parts per million
Non-detects (ND) laboratory analysis indicates that the contaminant is not present.	
Nephelometric Turbidity Unit (NTU) nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.	

Instructor's Notes
Public Relations—Page 15
CCR Blank Form page 3 of 3

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank CCR form will meet the needs of most rural water utilities in Alaska, but will NOT fit every need. For instance if you need more room to fill out the violations section or health effects section, you may have to add an additional sheet. Consult the CCR manual form EPA or contact ADEC for the exact health effects language to use for a particular contaminant. Also there are special paragraphs that are required if arsenic, nitrates, lead, cryptosporidium, or radon are detected.

TEST RESULTS							
Contaminant	Sample Date	MCL Violation	Level Detected	Unit Measurement	MCLG	MCL	Likely source of contamination to the best of our present knowledge
Microbiological Contaminants							
Total Coliform Bacteria				Detect/Non-detect	0	Note (1)	Naturally present in the environment
Fecal coliform and <i>E. coli</i>				Detect/Non-detect	0	Note (2)	Human and animal fecal waste
Note (1) one is a total coliform positive				Note (2) one is a fecal coliform or <i>E. coli</i> positive			
Turbidity							
Turbidity				NTU	n/a	Note (1)	Soil runoff
Turbidity				NTU	n/a	Note (2)	Soil runoff
Note (1) highest value for the year, recorded in				; Highest allowable Treatment Technique value is () NTU			
Note (2) lowest monthly % of days the samples were below the Treatment Technique value of () NTU							
Radioactive Contaminants							
Alpha emitters				pCi/l	0	15	Erosion of natural deposits
Inorganic Contaminants							
Antimony				ppb	6	6	Discharge from industry
Arsenic				ppb	n/a	50	Erosion of natural deposits
Asbestos				MFL	7	7	Decay of asbestos deposits
Barium				ppm	2	2	Erosion of natural deposits
Beryllium				ppb	4	4	Discharge from industry
Cadmium				ppb	5	5	Corrosion of galvanized pipes
Chromium				ppb	100	100	Discharge from industry, erosion of natural deposits
Cyanide				ppb	200	200	Discharge from industry
Fluoride				ppm	4	4	Erosion of natural deposits; water additive which promotes strong teeth
Mercury (inorganic)				ppb	2	2	Erosion of natural deposits; Discharge from industry
Nickel				ppb	0	100	Discharge from industry
Nitrate				ppm	10	10	Leaching from septic tanks, sewage
Nitrite (as Nitrogen)				ppm	1	1	Leaching from septic tanks, sewage
Selenium				ppb	50	50	Discharge from industry
Thallium				ppb	0.5	2	Discharge from industry
Lead and Copper							
Lead				ppb	0	AL=15	Corrosion of household plumbing
Copper				ppm	1.3	AL=1.3	Corrosion of household plumbing
Volatile Organic Contaminants							
Benzene				ppb	0	5	Discharge from factories
Chlorobenzene				ppb	100	100	Discharge from industry
Ethylbenzene				ppb	700	700	Discharge from petroleum refineries
Trihalomethanes				ppb	0	100	By-product of water chlorination
Toluene				ppm	1	1	Discharge from petroleum factories
Xylenes				ppm	10	10	Discharge from industry
Other Contaminants Found							
Health Effects The health effects of any contaminants found that exceed the MCL are listed below							
Contaminant	Health Effects						

Instructor's Notes
Public Relations—Page 16
Trouble Ticket Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank Trouble Ticket form will meet the needs of most rural water utilities in Alaska.
3. If reviewing this Trouble Ticket with the class, make note of:
 - The area for follow-up information at the bottom of the form.
 - Emphasize discussing the Trouble Ticket during the weekly staff meeting.
 - Emphasize following-up with the person who noted the problem.
 - Emphasize reporting the problem and the RESOLUTION to the problem to the Council.

TROUBLE TICKET	
Date:	Time:
Name of person completing form:	
Name of person who noted problem:	Contact Information
	Phone#:
	Address:
<p>Problem Description (when, where, what):</p> <p>Date:</p> <p>Location:</p> <p>Problem:</p>	
Utilities response given to the person who noted problem:	
<p>Action taken to correct problem (when, where, what)</p> <p>Date:</p> <p>Location:</p> <p>Action:</p>	
<p>Follow Up</p> <p>Discussed Trouble Ticket at Staff Meeting <input type="checkbox"/></p> <p>Informed person who noted problem of the Action Taken <input type="checkbox"/></p> <p>Include Trouble Ticket Summary in Monthly Report to Council <input type="checkbox"/></p>	

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Unit 5

Inventory Control

Instructor's Notes

Inventory Control—Unit Overview

Instructor class preparation

1. There are 3 exercises in this Unit. Make sure you are familiar with the exercises before you begin.
2. There are no sample forms for this Unit.
3. The heart of this Unit understanding how to start an inventory control system, and keep it simple that it is useful, easy to use, and easy to maintain, so that it will continue to be used.

Proposed Length: 2 hours

Schedule:

- | | |
|--------------------------------------|--------|
| • Inventory control overview | 10 min |
| • Exercise 5-1 What to inventory | 20 min |
| • Continue inventory | 10 min |
| • Exercise 5-2 Review Inventory Card | 10 min |
| • Break | 10 min |
| • Storeroom Design/Location | 10 min |
| • When /When not to use computers | 20 min |
| • Exercise 5-3 MS Access demo | 10 min |
| • Review/Worksheet/Action Plan | 20 min |

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

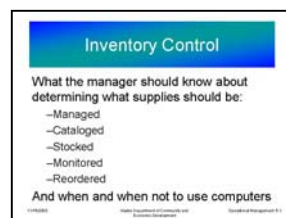
If doing MS Access demonstration:

10. Laptop with MS Access
11. Computer projector

Speaker Notes

Slide 5-1

1. Review the proposed schedule for this Unit (adjust schedule if needed based on the results of the self assessment).
2. Review the **Learning Objective** and the **Key Concepts to Learn** for the Unit.
3. Confirm which topics to focus the most attention on based on the class expectations



Inventory Control—Page 1

Learning Objectives

The goal of this Unit is to introduce the utility manager to some of the concepts used to manage inventory, and to provide some tools to the manager to make starting an inventory system easier. A second goal of this Unit is to have the manager understand some of the benefits and hindrances to using computers.

Inventory Control

What the manager should know about determining what supplies should be:

- Managed
- Cataloged
- Stocked
- Monitored
- Reordered

And when and when not to use computers

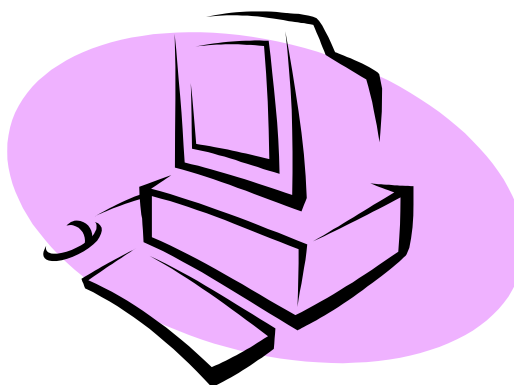
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Operational Management 5-1

Key Concepts to Learn

- The ability to determine what supplies and equipment need to be managed (accounted for).
- The ability to catalog the existing supplies and equipment on hand at the utility.
- The ability to determine what the appropriate amount of supplies and equipment to have on hand that are needed to operate the utility.
- The ability to monitor the use of supplies and equipment, and reorder replacements when needed.
- The ability to determine when computers can help make the job easier or add additional work.

Key Terms to Know

- Asset
- Inventory
- Consumable
- Supply
- Equipment
- Catalog
- Purchase Order



Inventory Control

References used to develop this Unit

- Jordan, JK, Maintenance Management, American Water Works Association, 1990
- Basic Management Principles for Small Water Systems, An AWWA Small-Systems Resource Book, American Water Works Association, 1982

Instructor's Notes

Inventory Control—Page 2

Speaker Notes

Slide 5-2

Review the basic concepts behind:

What inventory control means

- Knowing what things you need to have on hand to operate the utility
- Knowing what things you do have
- Keeping track of the use of things (going in, and going out)



Why inventory control is important

- Relate to public health, and timeliness of responding to needs at the utility

How to start

- First figure out exactly what items to include in the inventory

From here start Exercise 5-1 below.

Exercise 5-1 Determining what to inventory

Time: Allow about 20 minutes.

Have an open class discussion about what assets, supplies, equipment, and/or tools each manager thinks they would include in an inventory system and why?

Record the list of ideas on a flip chart so that it can be referred to later if needed.

Are any managers using an inventory system now?

Ask them to share their experiences.

Inventory Control—Page 2

What is inventory control?

First let's define inventory. An inventory is an itemized list of assets or goods on hand. For a water or sewer utility, the inventory will include the major facilities such as the well, water treatment plant and equipment, and storage tank; plus the supplies needed to operate the utility, such as calcium hypochlorite, spare pumps, and light bulbs. Inventory control is the process of cataloging the assets and managing the supplies.

Why is inventory control important?

To responsibly manage the utility, the manager needs to know what facilities and equipment make up the utility and what they are worth. Having an accurate idea of the total worth of the utility is important when determining the amount of insurance to purchase for the utility.

Knowing this total value of the utility is also an important reminder of the importance of operating the facility properly by reminding the staff and the public what a huge expense it would be to replace the utility's facilities if they were ever severely damaged.

Not only is it important for the utility manager to know what facilities and equipment make up the utility, and their total value, but the manager should also know what supplies and tools are available. It is the utility manager's responsibility to see that the parts, supplies, and tools his employees need are available so that they can provide timely service without interruption. A lack of key supplies, or lost, missing or broken tools or equipment could result in delayed responses to water main breaks, or chemical spills, resulting in a increased risk to the public health of the community.

Inventory Control

- **What is inventory control?**
 - Cataloging assets and managing supplies
- **Why do inventory control?**
 - Helps protect public health by insuring critical supplies and equipment are on-hand when they are needed.
- **How do you start?**
 - By determining what the critical supplies and assets are.

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Operational Management 6-2

How do you start an inventory control system?

1. Determining what assets, supplies, equipment, and tools to manage.

The first thing to do to get started is to decide what assets, equipment, tools, and supplies are critical to the operation of the utility. The manager probably does not want to try and manage and account for in detail all the supplies and tools that the utility uses. For instance, it is rarely worth while to try and account for small items like office supplies (pens, pencils, paperclips), small hand tools (screw drivers, pliers, hammers), and pipe fittings (copper elbows, tees, bends). But it would be very beneficial to know how many spare lift station pumps the utility had in stock. It is also useful to know about relatively inexpensive items that are essential to the operation of the utility like certain control relays.

The inventory of facilities like wells, treatment equipment, and storage tanks, will not have to be monitored often, once it is first completed since these are not “consumable” items. Once these items are inventoried and their values established, unless conditions drastically change, their value should remain fairly constant, only requiring at most an annual review. Most of the facilities should probably be included in the initial inventory since knowing the total value of the utility is very important.

Instructor's Notes

Inventory Control—Page 3

Speaker Notes

Slide 5-3

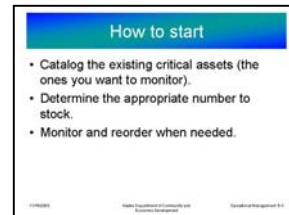
Review how to go about cataloging existing assets

Review factors to consider when determining the appropriate quantity to stock.

- Definite need
- Long order time
- Critical to facility operation
- Age of equipment
- Storage space
- Costs

Review monitoring usage and reordering.

- Work with staff to create a system everyone will use.

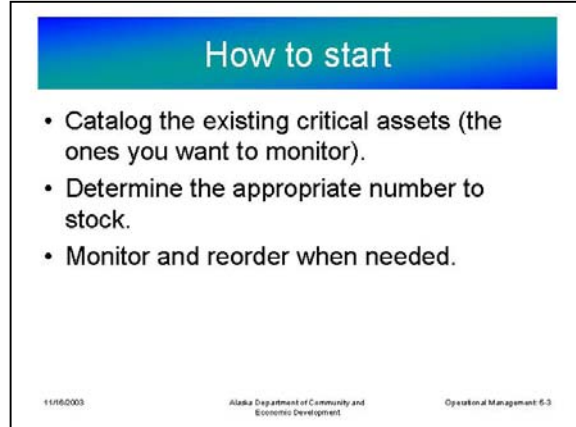


Inventory Control—Page 3

2. Cataloging the existing assets

Inventory should be recorded either in a hand written system or on a computer database. An example Inventory Control Index Card is shown on the next page. It is an example of a hand written system for inventory control. Even if using a computer database system, it is often easier to first complete an index card for each item. Entering data on a computer is much easier if the data is already organized.

The Inventory Control Cards (or the computer database) help the manager account for the purchase and issue of supplies, and help make decisions about what quantity of an item to keep in stock, or whether to keep any in stock. The Inventory control cards also contain valuable purchasing information. Even if the utility does not keep an item in stock, it is very valuable to know who to contact to get that item when it is needed.



3. Determining the appropriate quantity to stock

Inventory stock should be kept to a minimum. An item should be stocked only if a definite need for the item exists or if it will take too long to obtain the item if it is not in stock. Some items are infrequently used but may be vitally needed in an emergency. These items should also be stocked.

The appropriate quantity of item to be stocked will depend on many factors. Usage patterns, delivery time, and availability will be some of the key things to consider. Use of the Inventory Control Cards will help in this determination.

Other things to consider about what and how much to keep in stock include:

- The age of the equipment: if something is obsolete and is scheduled for replacement, do not invest in many spare parts for it.
- Storage space: lack of adequate storage space will place limits on what supplies can be stocked.
- Overhead costs: is there enough money to buy excess inventory?

4. Monitoring usage and reordering

Though a bit tedious, cataloging the inventory is sometimes easier than the continuous monitoring of the inventory. Monitoring, though much simpler than the initial cataloging, takes a lot of self discipline. Both the written index card system and the computer database require constant updating every time something is taken out of stock, or something is received from a supplier.

The manager has to work with the staff to devise a system that is user friendly so that the staff will continue to use it.

Tools can be handled a little differently than supplies. When tools are first purchased, they should be entered on an Inventory Control Card, but put in a separate file marked *Tools*. When a tool is issued, it should not be recorded on an Inventory Control Card. Instead a tool sign-out book should be kept to record each tool issued and returned, the dates, and the user. Tools that are regularly used by operators on a daily basis should be permanently signed out to them.

Inventory Control—Page 4

Inventory Control Card
General Information

product name: *Calcium Hypochlorite* location: *water treatment plant/store room*
 other product info: *20 lb plastic tub* lot size: *1 each*
 for: *water treatment (critical)*
 supplier: *Glacier Chemicals* (800) 888-9999 fax 888-9998
Kaktovik, Ak 99999 contact: *Bilots Fromme*

monthly usage	used for (routine or emergencies)	order lag	min qty	reorder point	reorder qty	max qty
<i>1</i>	<i>routine and emergency</i>	<i>4 weeks</i>	<i>1</i>	<i>2</i>	<i>1</i>	<i>3</i>

Inventory Control Card—Front

date	in	out	on hand	account	unit cost	total cost	document
<i>1/20</i>	<i>2</i>	<i>-</i>	<i>2</i>	<i>inv</i>	<i>\$80.00</i>	<i>\$160.00</i>	<i>P.O. 4567</i>
<i>2/1</i>	<i>-</i>	<i>1</i>	<i>1</i>	<i>wtp</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>routine task list</i>
<i>2/28</i>	<i>1</i>	<i>-</i>	<i>2</i>	<i>inv</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>P.O. 4569</i>
<i>3/1</i>	<i>-</i>	<i>1</i>	<i>1</i>	<i>wtp</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>routine task list</i>
<i>4/1</i>	<i>-</i>	<i>1</i>	<i>0</i>	<i>wtp</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>routine task list</i>
<i>4/4</i>	<i>1</i>	<i>-</i>	<i>1</i>	<i>inv</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>P.O. 4581</i>
<i>4/25</i>	<i>1</i>	<i>-</i>	<i>2</i>	<i>inv</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>P.O. 4583</i>
<i>5/1</i>	<i>-</i>	<i>1</i>	<i>1</i>	<i>wtp</i>	<i>\$80.00</i>	<i>\$80.00</i>	<i>routine task list</i>

Inventory
Control

Inventory Control Card—Back

Instructor's Notes

Inventory Control—Page 5

Speaker Notes

Slide 5-5

Review the importance if have a dedicated space for storing tools and supplies.

Review the suggested guidelines for selecting and organizing a storeroom.



Slide 5-6

Review what a computer is good at doing

- Sorting through large quantities of data
- Compiling the results

Review what a computer is not good at

- Collecting the data
- Telling the manager what to do with the results



Review the points in the slide for when to use and when not to use computers.

The main point is. Small systems do not HAVE to use a computer for inventory control

Inventory Control

Exercise 5-3 Computer Demonstration of MS Access Inventory Control

Time: Allow about 10 minutes.

There is a template for an Inventory Control Database in MS Access. Assuming that there is a laptop computer that has MS Access on it hooked up to a computer projector, show how an Inventory Control database can be started.

Enter a fictional company, several inventory items, supplies, purchase orders.

Practice accessing several of the reports.

Are the reports that helpful? Does this database provide the information that a manager would want?

Does it seem easy to maintain?

Inventory Control—Page 5

Storeroom Design and Location

Many small water treatment facilities in Alaska do not have a separate dedicated locked room to store spare parts and tools. Consequently, tools become lost or are stolen, and spare parts are scattered throughout the plant, stashed under cabinets, over offices, or on an empty part of the floor. The manager should attempt to identify an appropriate location to be used to store tools and supplies.

The following guidelines* can be used to help select and organize a storeroom:

- Select a clean dry room or shed with locking doors (preferably no windows).
- Clean out the storeroom. Dispose of unneeded or obsolete items and all junk.
- Obtain shelving units suitable for storing parts and supplies in an organized fashion.
- Place all similar items together on the shelves (vehicles parts near each other, pipe fittings near each other).
- Leave supplies in their original packaging to protect them from rust and dirt and for easy identification.
- Store heavy items, such as large valves or bags of cement, on wooden pallets near the storeroom door to minimize handling and lifting.
- Store large, weather resistant materials, such as culvert sections and lumber, outdoors, preferably in a fenced yard.
- Store all tools, other than those routinely carried in tool boxes, on a shadow board or wall board.
- Keep extension cords, hoses, and rope neatly coiled on wall hooks.
- Store flammable materials in a separate shed or specially designed cabinet.

Storeroom Design and Location

- Clean, dry with locking door (no windows)
- Get rid on junk
- Get good shelves
- Group like items on shelves
- Leave items in original packages
- Heavy items near the door
- Weather resistant items in fenced yard

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Operational Management 5-5

When and When Not to Use Computers ;)

In many cases, especially in inventory control, a computer may seem like the natural solution to all a managers problems. A manager may think, “The computer can tell me when I need to order something.” Computers are fantastic machines that can sort through reams of data and spit out a report in the blink of an eye. But they can not collect the data (in most cases) for you, or tell you how to use the results from the report. If a computer system is used, a manager still has to collect the inventory data to put into the computer, and interpret the reports that the computer outputs.

Computers cost money, and the hardware and software need to be upgraded now on average every three years. Learning how to use a computer can take weeks. If

A computer is very useful for sorting though data, like accounting or inventory records. It is especially useful for sorting large quantities of data. If the utility is handling large volumes of data, then a computer will likely pay for itself in time saved sorting through files, etc. If the utility will have a small inventory, then setting up a a computer system for inventory control may not be worth the effort. Slide 5-6 lists other things to consider when determining whether to use a computer for inventory control.

Computers for Inventory Control

- | | |
|--|--|
| <ul style="list-style-type: none"> • When to use <ul style="list-style-type: none"> – Inventory control consistently monitored – Purchase orders done monthly (or more often) – Large volume of stock – Reliable power source – Sufficient revenue to upgrade every few years | <ul style="list-style-type: none"> • When not to use <ul style="list-style-type: none"> – Inventory control sporadic – Items only purchased a few times a year – Small stock – Unreliable electricity – No budget for computers, software upgrades & training |
|--|--|

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Operational Management 5-6

*adapted from Basic Management Principles for Small Water Systems, An AWWA Small-Systems Resource Book, American Water Works Association, 1982

Instructor's Notes

Inventory Control—Page 6

Speaker Notes

Inventory Control Review and Worksheet

1. Review what was covered in this Unit on Inventory Control
2. Review the Key Concepts and Key Terms at the beginning of the Unit, and ask if there are any questions.
3. Begin work on the worksheet. The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion.

Worksheet Answers

1. True or **False**: Inventory Control is important because it is required by the Safe Drinking Water Act.

Inventory control is important to help the utility protect public health.

2. **True** or False: NOT having critical spare parts on hand could potentially cause the water system to have to shut down, jeopardizing the health of people in the community.

See the answer above.

3. True or **False**: If an Inventory Control System is used at the Utility, then all supplies should be included.

The manager and the staff have to determine what items they think are critical to monitor. Everything does not have to be monitored.

4. **True** or False: If an Inventory Control System is used, supplies in stock should be kept at a minimum.

Having items in stock is an expense. Keep the expense to a minimum. Choose wisely.

5. **True** or False: It doesn't matter how the manager sets up the monitoring and reordering system as long as it is user friendly and all the staff understand and use it.

Be creative and set up something that all the staff will use.

6. **True or False**: A storeroom is not a critical element of an inventory control system.

This one could go either way. What are good arguments for each side?

7. True or **False**: An inventory control system will work better if the records are kept on a computer in an inventory database.

Using a computer does not guarantee quality. It does guarantee some expenses though.

Action Plan

After doing the worksheet, complete the Action Plan for this Unit.

Inventory Control—Page 6

Inventory Control Review and Worksheet

This Unit introduced the manager to the importance of having an inventory control system and provided tools to help start an inventory control system. This Unit also discussed things to consider when deciding whether or not to use computers to help maintain records.

Worksheet

1. True or False: Inventory Control is important because it is required by the Safe Drinking Water Act.
2. True or False: NOT having critical spare parts on hand could potentially cause the water system to have to shut down, jeopardizing the health of people in the community.
3. True or False: If an Inventory Control System is used at the Utility, then all supplies should be included.
4. True or False: If an Inventory Control System is used, supplies in stock should be kept at a minimum.
5. True or False: It doesn't matter how the manager sets up the monitoring and reordering system as long as it is user friendly and all the staff understand and use it.
6. True or False: A storeroom is not a critical element of an inventory control system.
7. True or False: An inventory control system will work better if the records are kept on a computer in an inventory database.

Action Plan

Write down at least one thing (and no more than three) that you learned this lesson (Inventory Control) that could be done in your community.

1. _____

2. _____

3. _____

This page is intentionally blank

Unit 6

Contingency Planning

Instructor Notes

Contingency Planning—Page 1

Instructor class preparation

1. There are 3 exercises in this Unit. Make sure you are familiar with the exercises before you begin.
2. There are 4 sample forms for this Unit.
3. The heart of this Unit how to conduct a vulnerability assessment, then address the weaknesses that are determined from the assessment.

Proposed Length: 4 hours

Schedule:

- | | |
|------------------------------------|--------|
| • Exercise 6-1 A Case Study | 30 min |
| • Contingency Planning | 20 min |
| • Vulnerability Assessments | 30 min |
| • Exercise 6-2 Security Assessment | 60 min |
| • Break | 10 min |
| • Emergency Response Plans | 30 min |
| • Exercise 6-3 Boil Water Notice | 40 min |
| • Review/Worksheet/Action Plan | 20 min |

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Helpful references to have on hand

- [Security Vulnerability Self Assessment Guide for Small Drinking Water Systems](#); Association of State Drinking Water Administrators, National Rural Water Association , May 30, 2002

Speaker Notes

Start this lesson off with Exercise 6-1, the xxx case study. After the case study, then have the participants open their books to this unit and start the Contingency plan discussion below.

Slide 6-1

1. Review the schedule for this Unit (adjust schedule if needed based on the results of the self assessment).
2. Review the **Learning Objective** and the **Key Concepts to Learn** for the Unit.
3. Confirm which topics to focus the most attention on based on the class expectations



Contingency Planning—Page 1

Learning Objectives

The goal of this lesson is to provide the Utility Manager with a method for developing contingency plans for their utility.

Key Concepts to Learn

After completing this lesson, you should be able to:

- Perform a Vulnerability Assessment for your utility
- Prioritize action items from the Vulnerability Assessment into a mitigation plan
- Develop an emergency action plan that outlines procedures to enact during a natural or man-made disaster

Contingency Planning

Topics for this lesson

- Performing a Vulnerability Assessment
- Mitigating risks
- Developing an Emergency Response or Contingency Plan

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Operational Management 6-1

Key Terms to Know

- Natural Disaster
- Man-made disaster
- Vulnerability Assessment
- Mitigation Plan
- Emergency Response Plan



References used to develop this Unit

- Emergency Planning for Water Utilities: Manual of Water Supply Practices M19, forth edition, American Water Works Association, 2001
- Security Vulnerability Assessment Self Assessment Guide for Small Drinking Water Systems, Association of State Drinking Water Administrators & National Rural Water Association, May 2002
- Large Water System Emergency Response Plan Outline: Guidance to Assist Community Water Systems in Complying with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, U.S. Environmental Protection Agency, Office of Water, July 2003.

Instructor Notes

Contingency Planning—Page 2

Speaker Notes

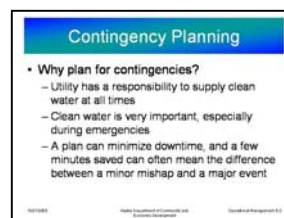
Note that in this text the terms “contingency plan”, “emergency response plan”, and “preparedness plan” are all used interchangeably. No distinction is made between them.

Discuss why contingency planning is important.

Ask the class participants if they think contingency planning is important (provide a definition of contingency planning if needed). If there are participants that think contingency planning is important, ask them to name reasons why they think it is important. List their reasons on a flip chart. Use these reasons as points for discussion.

Slide 6-2

Put up slide 6-2 to summarize why contingency planning is important.



Discuss what types of emergencies a utility should plan for.

Ask the participants to name emergency situations (both natural and man-made) that they think the utility should plan for.

List these emergency situations on a flip chart under the headings “natural” or “man-made.”

Slide 6-3

Put up slide 6-3 and compare the participants emergency situations with the ones listed on the slide.



Contingency Planning—Page 2

This lesson introduces the utility manager to the concepts of contingency planning which include: vulnerability assessments (how to determine what areas of your water system need the most attention for given situations), developing a mitigation plan that addresses the risks identified in the vulnerability assessment, and developing a contingency plan or emergency response plan to address natural and man-made disasters.

What is a Contingency Plan?

A contingency plan can also be called an Emergency Response Plan or a Preparedness Plan. It is a written policy that outlines in concise plain language, the specific steps that should be taken to ensure that your utility continues to provide the highest level of service possible for given foreseeable emergencies such as natural or manmade disasters.

Contingency Planning

- **Why plan for contingencies?**
 - Utility has a responsibility to supply clean water at all times
 - Clean water is very important, especially during emergencies
 - A plan can minimize downtime, and a few minutes saved can often mean the difference between a minor mishap and a major event

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Why is a Contingency Plan important?

Safe and reliable drinking water is vital to every community, especially so in the event of an emergency such as a natural disaster in the community. Every emergency is unique, but advanced planning increases the likelihood that the utility will respond in an organized and efficient manner, minimizing the impact of the emergency on the water system. A few minutes can often mean the difference between a minor mishap and major event.

What emergencies do you plan for?

Natural and human-caused disasters can create major emergencies. Each type of disaster produces hazards that can damage water system components and disrupt normal service. A hazard is a source of potential damage associated with a disaster. Examples are the high waters from a flood or the ground shaking of an earthquake. The most common natural disasters and human-caused disasters that occur in Alaska are listed in the slide to the right.

Disasters and hazards

<ul style="list-style-type: none"> • Natural Disasters <ul style="list-style-type: none"> – Earthquakes – Floods – Forest Fire – Volcanic Eruption – Other Severe Weather (wind, extreme cold, heavy snow, ice) – Waterborne Diseases 	<ul style="list-style-type: none"> • Man-made Disasters <ul style="list-style-type: none"> – Hazardous materials release – Structure Fires – Construction or transportation accidents – Vandalism, riots, strikes, terrorism
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Hazard summaries

A hazard summary lists the disasters that can affect a water system and the potential magnitude of the hazards associated with those disasters. On the next page (page 6-3) is a sample hazard summary form for water and sewer utility in the fictional community of Muddy River, Alaska (described in Unit 2). This format can be expanded or condensed to meet individual system needs.

The “estimated probability” column on the form includes the average occurrence interval of each disaster for this particular water utility. The estimated probability could also be more generally rated as low, medium, or high. By listing all disaster possibilities and rating their probabilities of occurrence, it is possible to establish emergency planning priorities.

The “estimated magnitude” column on the form includes the potential severity of the hazard using measurements like Richter scale magnitude, temperature, or flood elevation.

The hazard summary is one element of the vulnerability assessment, which is discussed later.

Instructor Notes

Contingency Planning—Page 3

Speaker Notes

Slide 6-4

Explain that once the list of types of emergencies to plan for has been completed, that the process of compiling a “hazard summary” has begun.

Explain what a “hazard summary” is and review the example on page 6-3.

Note that there can be several types of hazards associated with any particular catastrophic event.

The “hazard summary” will be used to assess the likelihood of damage to particular utility system components during the vulnerability assessment process.

Hazard Summary			
Type of Hazard	Estimated Frequency	Estimated Magnitude	Comments
Earthquake	1 in 10 years	7.0 magnitude	
A. Flood region	Annual	5 feet	Water level
B. Flood plain	Annual	3 feet	Water level
C. Flood plain	Annual	1 foot	Water level
D. Flood plain	Annual	0.5 foot	Water level
E. Flood plain	Annual	0.2 foot	Water level
F. Flood plain	Annual	0.1 foot	Water level
G. Flood plain	Annual	0.05 foot	Water level
H. Flood plain	Annual	0.02 foot	Water level
I. Flood plain	Annual	0.01 foot	Water level
J. Flood plain	Annual	0.005 foot	Water level
K. Flood plain	Annual	0.002 foot	Water level
L. Flood plain	Annual	0.001 foot	Water level
M. Flood plain	Annual	0.0005 foot	Water level
N. Flood plain	Annual	0.0002 foot	Water level
O. Flood plain	Annual	0.0001 foot	Water level
P. Flood plain	Annual	0.00005 foot	Water level
Q. Flood plain	Annual	0.00002 foot	Water level
R. Flood plain	Annual	0.00001 foot	Water level
S. Flood plain	Annual	0.000005 foot	Water level
T. Flood plain	Annual	0.000002 foot	Water level
U. Flood plain	Annual	0.000001 foot	Water level
V. Flood plain	Annual	0.0000005 foot	Water level
W. Flood plain	Annual	0.0000002 foot	Water level
X. Flood plain	Annual	0.0000001 foot	Water level
Y. Flood plain	Annual	0.00000005 foot	Water level
Z. Flood plain	Annual	0.00000002 foot	Water level

Contingency Planning—Page 3**Hazard Summary*****for Muddy River, Alaska Water & Sewer Utility (as described in Unit 2)**

Type of Hazard	Estimated Probability	Estimated Magnitude	Comments
Earthquake	1 in 60 years	7.0 (Richter)	
• Fault rupture	medium	2 feet	Melosi fault
• Ground shaking	high		
• liquefaction	Medium-low	Vertical & horizontal accelerations	Fill areas
• landslide	low		Area is flat
Forest Fire	Annual / high		
Floods	Annual / high		At washeteria/ water treatment plant
Other Severe weather			
• Extreme cold	Annual / high	-68 F	Lowest recorded temperature
• Heavy snow	Annual / high	4 feet	
• Ice storm	Medium		
• High wind	Medium	60-80 mph	Usually in spring and fall
• lighting	Low		
• drought	Low	well depth 47 feet	Low water table for well
Waterborne diseases	Low		Giardia, crypto
Haz mat release			
• Fuel spill	medium	Barge or 50 gal drum	Ground water infiltration
Structure fires	medium	Log homes	Most use wood stoves
Construction accidents	medium	Water main damage	While installing culverts, etc.
Trans accidents			
• Road	low		
• Air	medium	Fuel plane	Everts Air fuel, mail planes
Vandalism	medium		Storage tanks
Public/Private event	every 2-5 years	Increased water demand or decreased personnel availability	Increased population due to potlatch or funeral, or lack of personnel due to potlatch or funeral in nearby community

* This table adapted from Emergency Planning for Water Utilities, Manual of Water Supply Practices M19, Forth edition, American Water Works Association, 2001.

Instructor's Notes

Contingency Planning—Page 4

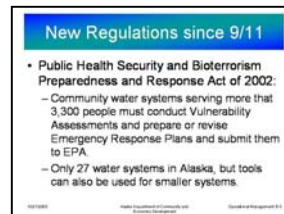
Speaker Notes

Slide 6-5

Briefly discuss how the Bioterrorism & Preparedness Response Act affected water systems serving a population over 3,300.

Note that less than 30 water systems in Alaska were affected, but the tools and resources developed to respond to the Act can be used by smaller water utilities.

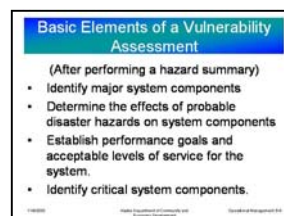
The Act (and therefore the tools and resources) focus on Security (or man-made emergencies), but can and should be applied more broadly to natural disasters as well.



Slide 6-6

Emphasize that a Vulnerability Assessment is a “PROCESS”, not a document, and it should be done on a regular basis because vulnerabilities of system components change over time as the utility infrastructure ages.

Note that a vulnerability assessment (for a water system serving fewer than 3,300 people) only has to be as detailed as is desired by the utility. The utility may want to start with a very basic assessment, then improve it each year.



Contingency Planning—Page 4

New Regulations since 9/11

In June 2002, the Public Health Security and Bioterrorism Preparedness and Response Act was signed into law, amending the Safe Drinking Water Act by adding section 1433, which requires:

- Community water systems serving more than 3,300 people conduct Vulnerability Assessments (VA), certify to the U.S. Environmental Protection Agency (EPA) that the VAs were conducted, and submit a copy of the VA and the certification to the EPA.
- Community water systems serving more than 3,300 people prepare or revise Emergency Response Plans (ERP), certify to EPA that an ERP has been completed, and submit a copy of the certification to EPA.

New Regulations since 9/11

- **Public Health Security and Bioterrorism Preparedness and Response Act of 2002:**
 - Community water systems serving more than 3,300 people must conduct Vulnerability Assessments and prepare or revise Emergency Response Plans and submit them to EPA.
 - Only 27 water systems in Alaska, but tools can also be used for smaller systems.

10/01/2003

Alaska Department of Community and Economic Development

Operational Management 6.3

Less than 30 water systems in Alaska were affected by this legislation, but the guidelines and principles developed to comply with it are useful tools that can be used by smaller water systems also.

One of the tools that was refined as a result of the Bioterrorism Act, is the Vulnerability Assessment. The Vulnerability Assessment tools developed as a result of the Bioterrorism Act tend to focus on security and preventing man-made disasters, but they are also useful to help assess vulnerabilities to natural disasters.

Vulnerability Assessments

What is a vulnerability assessment?

A vulnerability assessment is a process used to evaluate the components of a water system against the hazards from disasters to develop a prioritized plan to reduce the unwanted consequences from the disaster.

Why is a vulnerability assessment important?

The vulnerability assessment provides the utility a step-by-step approach to identifying weaknesses in the utility's infrastructure, procedures or policies that will be affected by a disaster. By identifying these weaknesses early, and addressing them, the utility's ability to respond to disasters, and provide the community with an uninterrupted supply of safe drinking water will be improved.

Basic Elements of a Vulnerability Assessment

(After performing a hazard summary)

- Identify major system components
- Determine the effects of probable disaster hazards on system components
- Establish performance goals and acceptable levels of service for the system.
- Identify critical system components.

11/02/2003

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How do you conduct a vulnerability assessment?

The vulnerability assessment process will range in complexity based on the design and operation of the water system, but will most likely have the basic elements outlined in slide above. The process described here assumes that the hazard summary discussed previously in this unit, has already been conducted.

1. Identify Major System Components

Key elements of the total system should be listed as described as components under the following general headings: (1) administration and operations; (2) source water; (3) transmission water; (4) water treatment facilities; (5) storage; (6) water distribution system; (7) waste water collection system; (8) waste water treatment; (9) waste water disposal; (10) electric power; (11) transportation; and (12) communications.

A suggested list of major components for a water and sewer utility are provided on the next page.

Instructor's Notes

Contingency Planning—Page 5

Speaker Notes

Slide 6-7

The first step in a vulnerability assessment is to identify the major system components.

Note that a suggested list of major water and sewer utility components is provided on pages 6-5 and 6-6.

The same list is also provided in the appendices with blank space under each heading for addition of more system components.

Note that PERSONNEL is listed a system component resource. PERSONNEL is the MOST important resource the utility has.

If the utility plan only lists ONE resource, then list PERSONNEL.

The utility's emergency response plan should describe what to do about personnel for each emergency hazard.

Vulnerability Assessments

1. Identify major system components

Suggested list of major water and sewer utility components

Component	Location and location (if applicable)	Description
Administration & Management		
Personnel		
Facilities		
Equipment		
Materials and Supplies		
Emergency Plan		
Electricity		
Water and wastewater resources		
Financial and other		

Page 5 of 5

Contingency Planning—Page 5

Suggested list of major water and sewer utility components

Component	Number and location (if applicable)	Description
Administration & Operations		
Personnel		
Buildings		
Computers		
Records and Files		
Emergency Plan		
Source Water		
Watersheds and surface water sources		
Reservoirs and dams		
Groundwater sources		
Wells and galleries		
Transmission System		
Intake structures		
Pump stations		
Pipelines, valves, and other appurtenances		
Water Treatment		
Facility structures		
Controls (manual and computer)		
Equipment (filters, pumps, boilers)		
Chemicals		
Water Storage		
Tanks (ground, elevated, pressure)		
Valves		
Piping		
Water Distribution System		
Pumps		
Pipes		
Valves		
Appurtenances (hydrants, backflow preventers, meters, etc.)		
Materials (extra pipe, valves, hydrants)		
Other vulnerable points		

Instructor's Notes
Contingency Planning—Page 6

Speaker Notes

This page is intentionally blank
See page 6-5 for speaker notes

Contingency Planning—Page 6

Suggested list of major water and sewer utility components (continued)

Component	Number and location (if applicable)	Description
Wastewater Collection System		
Pipes		
Manholes		
Lift stations (or vacuum stations)		
Wastewater Treatment		
Facility Structures (buildings, lagoon)		
Controls (manual and computer)		
Equipment (bar screens, aerators)		
Chemicals		
Wastewater Disposal		
Pipes and valves		
Receiving water body		
Leachfield		
Electric Power & Fuel Oil		
Transmission lines		
Transformers		
Standby generators		
Fuel storage		
Transportation		
Vehicles (include construction equipment)		
Delivery of supplies, spare parts, and fuel		
Infrastructure (roads, airports, docks)		
Communications		
Telephone		
Radio		
Telemetry (controls)		
Mass media (newspaper, radio, television)		

Instructor's Notes

Contingency Planning—Page 7

Speaker Notes

Slide 6-8

Discuss how to construct the Disaster Effects Matrix

- System components along the side
- Disaster hazards across the top
- X whether a particular disaster hazard affects a particular component

Review the example on page 6-8

There is a blank Disaster Effects Matrix form in the Appendices

Vulnerability Assessments				
2. Determine effects of disaster hazards on system components.				
System components Utility storage, lines and storage due to hazards	Earthquake	Power Out	Flash	
• Communications equipment				
• Emergency equipment (including computer records)				
System needs				
• Maintenance of critical system components				
• Emergency & disaster				
• Emergency response				
• Other & general				

Slide 6-9

Discuss how to establish performance goals.

- What level of service does the utility expect to provide during an emergency?
- Are there critical need users in the community (clinic, fire suppression systems)?

The Disaster Effects Matrix can be used to determine critical system components, or it can be done on a separate sheet of paper.

Vulnerability Assessments	
3. Establish performance goals & acceptable levels of service.	
Suggested goals:	
• Life safety	
• Fire suppression	
• Public health needs	
• Commercial and business uses	
4. Identify critical system components	

Slide 6-10

Discuss how to determine what actions to take to reduce the effects of hazards on the system components. A comparison of the desired actions can be made to help prioritize which actions to take.

Mitigation Plan	
Before implementing mitigation actions, ask:	
• How critical is the component to the system?	
• What is the age of the component?	
• What are present and projected expansion, replacement, or construction programs?	
• What is the cost of the mitigation action?	

Contingency Planning—Page 7

How do you conduct a vulnerability assessment? (continued from page 6-4)

2. Determine effects of probable disaster hazards on system components

Disaster hazards can degrade the quality and/or quantity of potable water supplies. Each hazard has unique impacts on different components of the utility, and damage to one part of the system may not affect other parts of the utility. For example, high winds may not disturb buried pipes but could damage electric transmission lines which could cause the interruption of water flow in the pipes. To easily visualize the effects of the hazards on the system components, construct a matrix combining the list of system components going down vs. list of hazards (from the hazard summary) going across. See the next page (page 6-8) for an example.

3. Establish performance goals and acceptable levels of service for the system.

As stated previously, a utility has a responsibility to provide clean safe water at all times. During an emergency the utility will probably be under a high demand for water, so specific goals and acceptable levels of service should be developed for the emergency conditions. Specific goals to consider are: life safety, fire suppression, public health needs, and commercial and business uses.

4. Identify critical system components

Critical components are the components that are the most vulnerable to failure because of a disaster hazard. The failure of a critical component will reduce the system's ability to meet the minimum health and safety performance goals set by the utility in the previous step. The best way to approach this step is to select one disaster scenario and then focus on those system components whose failure would yield the entire system inoperable. These are the most vulnerable components. Repeated application of this process to other disaster scenarios will eventually isolate the most critical components in the entire utility. A plan should then be developed to address the weaknesses of these critical components. This plan is known as the "Mitigation Plan."

Vulnerability Assessments

3. Establish performance goals & acceptable levels of service.

Suggested goals:

- Life safety
- Fire suppression
- Public health needs
- Commercial and business uses

4. Identify critical system components

11/6/2003 Alaska Department of Community and Economic Development Operational Management 6-9

Mitigation Plan

Once the critical utility components have been identified, action plans can be taken to render them less susceptible to the effects of disaster hazards. These mitigation actions can cover a wide variety of activities and can be as complex as installing a back-up generator or as simple as storing enough calcium hypochlorite.

Before implementing any mitigation actions, a quick analysis should be performed to determine the items listed in the adjacent slide. A form is provided in the Appendices to help with this analysis.

Mitigation Plan

Before implementing mitigation actions, ask:

- How critical is the component to the system?
- What is the age of the component?
- What are present and projected expansion, replacement, or construction programs?
- What is the cost of the mitigation action?

11/6/2003 Alaska Department of Community and Economic Development Operational Management 6-10

Instructor's Notes
Contingency Planning—Page 8

Speaker Notes

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See page 6-7 for speaker notes

Contingency Planning—Page 8

Disaster Effects Matrix

System components- Likely damage, loss, or shortage due to hazards	Earthquake	Forest Fire	Floods	Severe Weather	Waterborne disease	Haz mat release	Structure fires	Construction accidents	Transportation Accidents	Vandalism
Administration/operations • personnel • buildings & equipment (including computers) • records	X X X X	X X X X	X X X X		X		X X	X	X	X X X X
Source water • watersheds & surface water sources • reservoirs & dams • groundwater sources • wells & galleries	X X	X 	X X X X		X X X X	X X X X				X X X X
Transmission system • intake structures • pump stations • pipelines, valves & appurtenances	X X X X	X 	X X X X	X X X X			X	X X X X	X X X X	X X X X
Water treatment • facility structures • controls • equipment • chemicals	X X X X	X X X X	X X X X	X X X X			X X X X	X X X X	X X X X	X X X X
Water storage • tanks • valves • piping	X X X X	X 		X X X X	X	X	X		X X	X X
Water distribution system • pumps • pipes, valves & appurtenances • materials	X X X X	X X X X	X X X X	X X X X	X	X	X X	X X	X	X X X X
Waste water collection system • pipes • manholes • lift stations	X X X X	X 	X X X X	X			X	X X X X	X	X X
Wastewater treatment • facility structures (buildings, lagoon) • controls • equipment • chemicals	X X X X	X X X X	X X X X	X X X X			X X X X	X X X X	X X X X	X X X X
Wastewater disposal • pipes & valves • receiving body of water • leachfield	X X		X X X X	X		X X		X	X	X
Electric power & Fuel oil • transmission lines & transformers • standby generators • fuel storage	X X X X	X X X X	X X X X	X X X X			X X X X	X X X X	X X X X	X X X X
Transportation vehicles (including construction equipment) • delivery of supplies, spare parts, and fuel • Infrastructure (roads, airports, docks)	X 	X X X X	X X X X	X X X X				X X X X	X X X X	X X X X
Communication • Telephone & internet • radio • telemetry (controls)	X X	X X	X X X X	X			X X	X	X	X X X X

Contingency
Planning

Instructor's Notes

Contingency Planning—Page 9

Speaker Notes

Slide 6-11

A sample form to help with prioritization of mitigation action plan items is provided in the Appendices

Review the form:

The form is titled "Mitigation Action Plan Prioritization Form". It is a table with 5 columns: "Action Item & Critical Component", "How critical? (1=very critical, 5=not critical)", "Age of component", "Effect of component failure on system", and "Cost of mitigation action". The table has 5 rows, each with a "1" in the second column, "1" in the third column, "1" in the fourth column, and "1" in the fifth column. The first row is highlighted in blue.

- All system components in this list might be considered “critical” since they have already been selected out of the Disaster Effects Matrix. It is OK that all are “critical”, but this is a chance to further prioritize if needed.
- If a component is very new, action items may be delayed on that component, so that older components can be addressed first; or the new item may still be under warranty and the agency that constructed the system may be able to provide an improvement.
- If there is a plan for replacement of a particular component, then the utility may want to defer any mitigation actions, or make sure that they are included in the improvement.
- Cost will almost certainly be a factor. These mitigation actions will most likely have to be funded by the utility itself. Grant funding is not likely.

Slide 6-12

Review the requirements of the Bioterrorism Act as it relates to Emergency Response Plans.

Review the three principles for developing an ERP.

Review the elements of an ERP that small system will probably want to include.

The form is titled "Emergency Response Plan". It contains the following text:

- Not required for systems that serve less than 3,300 people, but it is a good tool.
- When writing an ERP:
 - Reference existing resources
 - Be concise and logical
 - Coordinate with other agencies.

Contingency Planning—Page 9

Mitigation plan (continued)

Some key components and actions that rural Alaskan communities should consider including in their mitigation plan are:

Personnel: Personnel safety should be the utility's first responsibility. Consider the following actions to help mitigate personnel shortages:

- Education
- cross-training
- alternate personnel
- assuring a safe workplace.

Vandalism: Vandalism (intentional or unintentional) can cause serious damage to the utility. For instance, a circulation pump being turned off can cause a water main to freeze beyond repair, or missing tools can delay emergency repairs. Also unintentional visitors in the treatment plant can injure themselves. Consider:

- ensuring all doors are locked and only authorized utility personnel have keys
- inventory and secure major tools and equipment
- install video security cameras monitoring for public spaces in the washeteria

Mitigation Action Plan					
Mitigation Action Plan Prioritization Form					
Action Item & system component	How critical? 3 very critical 1 not as critical	Age of component	Planned expansion, replacement, or construction?	Cost of mitigation action?	Take action? Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N

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Emergency Response Plan

The Public Health Security and Bioterrorism Act requires drinking water facilities serving more than 3,300 people to prepare an Emergency Response Plan (ERP) that incorporates the results of their vulnerability assessments. The U.S. Environmental Protection Agency (EPA) has developed guidance for large water utilities on how to develop an ERP. These documents can be large and complex depending on the complexity of the utility system. EPA will produce guidance for small and medium drinking water utilities in the near future, but until then—appropriate portions of the large system guide can be used as an outline. Since small systems (under 3,300 population) are not currently required to have an ERP, each small utility can develop a plan that fits their specific needs.

There are three principles to use when developing an ERP, namely: (1) Reference existing resources; (2) Be concise and logical; (3) Coordinate with other agencies

The elements of an ERP that a small utility will probably want to consider including are:

- **Plan Activation:** Under what circumstances should this plan be implemented
- **Communication Chart/Contact List:** phone numbers of key people to contact in the utility, the community and outside the community.
- **Disaster Specific Plans:** a concise list of who to call and what to do for specific disasters, like floods, hazardous materials spills, forest fires, etc.
- **Component Specific Plans:** a concise list of who to call and what to do if a particular system component, such as the well, is damaged.

Emergency Response Plan	
<ul style="list-style-type: none"> • Not required for systems that serve less than 3,300 people, but it is a good tool. • When writing an ERP: <ul style="list-style-type: none"> – Reference existing resources – Be concise and logical – Coordinate with other agencies. 	

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On the next page is the recommended outline for an ERP for a larger water system.

Instructor's Notes

Contingency Planning—Page 10

Speaker Notes

Slide 6-13

Discuss what is recommended to be included in an ERP by the Association of State Drinking Water Administrator (very similar, but not as detailed as the EPA guidance).

The requirement for an ERP is nationwide legislation, but each state may have their own additional requirements.

- Each utility is unique
- The ERP should fit the needs of the utility.



Contingency Planning—Page 10

ASDWA* Suggested Outline for an Emergency Response Plan for Large Drinking Water Systems

I. Introduction, Goals, and Importance

II. Emergency Planning Process

- a. Planning partnerships: The planning process should include those parties who will need to help the utility in an emergency situation (e.g. first responders, law enforcement, public health officials, etc.)
- b. Scenarios: Incorporate VA findings to develop scenarios (events that could cause emergencies/severity of emergencies) in order to flesh out response needed.

III. Emergency Response Plan

1. System Specific Information

- a. PWS ID, Owner, Contact Person
- b. Population served and service connections
- c. System Components
 - Source Water
 - Storage
 - Treatment Plant
 - Distribution System

2. Alternate Water Sources

3. Chain of Command Chart in Coordination with Local Emergency Planning Committee (Internal and External Emergency Responders)

- Contact Name
- Organization and Responsibility
- Telephone Number

4. Communication Procedures

Who, What, When (using Chain of Command Chart and following Notification Lists)

- a. Internal Notification List
- b. External Notification List
 - First Responders (local police and emergency squad)
 - State Personnel
 - Health Department
 - Customers
 - Service/Mutual Aid
 - Others?
- c. Public/Media Notification (How to Communicate)

5. Emergency Response Protocols

To implement in the event of a terrorist attack or intentional act in order to lessen the impact)

- a. Protocols must include:
- b. Protocols should also provide for the following activities:
 - i. Assess the Problem
 - ii. Isolate and Fix the Problem
 - iii. Monitoring
 - iv. Recovery
 - v. Return to Safety
 - vi. Report of Findings

IV. Next Steps

- a. Plan Approval
- b. Practice! And Plan to Update (as necessary; once every year recommended)

V. Appendix of Resources/Links

*Association of State Drinking Water Administrators

Instructor's Notes

Contingency Planning—Page 11

Speaker Notes

Contingency Planning Review and Worksheet

1. Review what was covered in this Unit on Contingency Planning
2. Review the Key Concepts and Key Terms at the beginning of the Unit
3. Begin the worksheet. The purpose of the worksheet is not to test knowledge, but to assist in the review of the Unit and create a catalyst for discussion.

Worksheet Answers

1. True or **False**: The most important component of the water and sewer utility is the water source.

The most important component is the personnel (in the opinion of the author).

2. True or **False**: Small water and sewer utilities (serving less than 3,300) people, are required to perform a vulnerability assessment and draft an emergency response plan.

At the current time, only medium and large water systems are required to perform a vulnerability assessment and draft an emergency response plan. Small systems can still do these activities if they want.

3. True or **False**: An emergency response plan should contain a detailed contact list with names, agencies, phone numbers, addresses, and e-mail addresses of all potential responders to emergencies in the village.

The emergency contact list should be simple and concise, and should only contain the names and phone numbers of the few people that need to be notified in case of an emergency. The emergency contacts can provide their addresses if needed when they are contacted.

4. True or **False**: There is nothing that can be done to prepare for a catastrophic natural disaster as large as the Denali Fault earthquake of November 2002.

There are actions that can be taken to prepare for even catastrophic disasters. Just having an emergency response plan with contact information is one way to prepare.

5. True or **False**: The vulnerability assessment is a public document that should be posted in a public place and shared throughout the community.

The vulnerability assessment is NOT a public document. Larger utilities are required to have filed under lock and key.

6. True or **False**: An emergency response plan for hazards associated with structure fires is not needed since the fire department takes care of that.

The fire department may handle the fire itself, but what about the utility's response after the fire?

7. **True** or False: A death in a nearby community should be considered an "emergency situation" since it may result in a personnel shortage if utility staff leave town to attend a memorial potlatch or funeral.

This may or may not be true for any particular community. If many people from the same family are employed by the utility, then this should be considered.

Action Plan

After doing the worksheet, complete the Action Plan for this Unit.

Contingency Planning—Page 11

Contingency Planning Review and Worksheet

This Unit was about the manager's role in assessing the utility for vulnerabilities, determining what actions items to take to address those vulnerabilities, and developing an emergency response plan.

Worksheet

1. True or False: The most important component of the water and sewer utility is the water source.
2. True or False: Small water and sewer utilities (serving less than 3,300) people, are required to perform a vulnerability assessment and draft an emergency response plan.
3. True or False: An emergency response plan should contain a detailed contact list with names, agencies, phone numbers, addresses, and e-mail addresses of all potential responders to emergencies in the village.
4. True or False: There is nothing that can be done to prepare for a catastrophic natural disaster as large as the Denali Fault earthquake of November 2002.
5. True or False: The vulnerability assessment is a public document that should be posted in a public place and shared throughout the community.
6. True or False: An emergency response plan for hazards associated with structure fires is not needed since the fire department takes care of that.
7. True or False: A death in a nearby community should be considered an "emergency situation" since it may result in a personnel shortage if utility staff leave town to attend a memorial potlatch or funeral.

Action Plan

Write down at least one thing (and no more than three) that you learned this lesson (Contingency Planning) that could be done in your community.

1. _____

2. _____

3. _____

Instructor's Notes
Contingency Planning—Page 12
Hazard Summary Blank Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank Hazard Summary form will meet the needs of most rural water utilities in Alaska.
3. If reviewing this Hazard Summary form with the class, make note of:
 - This form is used as a “brainstorming tool” and is not meant to be a complete list.
 - Some common hazards are listed.
 - Cross out ones that do not apply.
 - Add additional hazards on the blank lines.

Type of Hazard	Estimated Probability	Estimated Magnitude	Comments
Earthquake			
• Fault rupture			
• Ground shaking			
• liquefaction			
• landslide			
Forest Fire			
Floods			
Other Severe weather			
• Extreme cold			
• Heavy snow			
• Ice storm			
• High wind			
• lighting			
• drought			
Waterborne diseases			
Haz mat release			
• Fuel spill			
Structure fires			
Construction accidents			
Trans accidents			
• Road			
• Air			
Vandalism			
Public/Private event			

Instructor's Notes
Contingency Planning—Page 13
List of Water & Sewer Utility Components Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank list of Water & Sewer Utility Components form will meet the needs of most rural water utilities in Alaska.
3. If reviewing this form with the class, make note of:
 - This form is used as a “brainstorming tool” and is not meant to be a complete list.
 - Some common utility components are listed.
 - Cross out ones that do not apply.
 - Add additional components on the blank lines

Water & Sewer Utility Components—Page 1

Component	Number and location (if applicable)	Description
Administration & Operations		
Personnel		
Buildings		
Computers		
Records and Files		
Emergency Plan		
Source Water		
Watersheds and surface water sources		
Reservoirs and dams		
Groundwater sources		
Wells and galleries		
Transmission System		
Intake structures		
Pump stations		
Pipelines, valves, and other appurtenances		
Water Treatment		
Facility structures		
Controls (manual and computer)		
Equipment (filters, pumps, boilers)		
Chemicals		
Water Storage		
Tanks (ground, elevated, pressure)		
Valves		
Piping		
Water Distribution System		
Pumps		
Pipes		
Valves		
Appurtenances (hydrants, backflow preventers, meters, etc.)		
Materials (extra pipe, valves, hydrants)		
Other vulnerable points		

Instructor's Notes
Contingency Planning—Page 14
List of Water & Sewer Utility Components Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank list of Water & Sewer Utility Components form will meet the needs of most rural water utilities in Alaska.
3. If reviewing this form with the class, make note of:
 - This form is used as a “brainstorming tool” and is not meant to be a complete list.
 - Some common utility components are listed.
 - Cross out ones that do not apply.
 - Add additional components on the blank lines

Water & Sewer Utility Components—Page 2

Component	Number and location (if applicable)	Description
Wastewater Collection System		
Pipes		
Manholes		
Lift stations (or vacuum stations)		
Wastewater Treatment		
Facility Structures (buildings, lagoon)		
Controls (manual and computer)		
Equipment (bar screens, aerators)		
Chemicals		
Wastewater Disposal		
Pipes and valves		
Receiving water body		
Leachfield		
Electric Power & Fuel Oil		
Transmission lines		
Transformers		
Standby generators		
Fuel storage		
Transportation		
Vehicles (include construction equipment)		
Delivery of supplies, spare parts, and fuel		
Infrastructure (roads, airports, docks)		
Communications		
Telephone		
Radio		
Telemetry (controls)		
Mass media (newspaper, radio, television)		

Instructor's Notes
Contingency Planning—Page 15
Disaster Hazards Effects Matrix Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank Disaster Hazard Effects Matrix form will meet the needs of most rural water utilities in Alaska.
3. If reviewing this form with the class, make note of:
 - This form is used as a “brainstorming tool” and is not meant to be a complete list.
 - The titles for the common utility components are listed, but the actual components are not listed. Each utility will have to list their components
 - Cross out titles that do not apply.
 - Add additional components on the blank lines.
 - Common hazards are listed.
 - Add additional hazards in the blank columns.

Disaster Hazards Effects Matrix

System components- Likely damage, loss, or shortage due to hazards		Earthquake	Forest Fire	Floods	Severe Weather	Water borne disease	Haz mat release	Structure fires	Construction accidents	Transportation Accidents	Vandalism	
Administration/operations <ul style="list-style-type: none">•••												
Source water <ul style="list-style-type: none">•••												
Transmission system <ul style="list-style-type: none">•••												
Water treatment <ul style="list-style-type: none">•••												
Water storage <ul style="list-style-type: none">•••												
Water distribution system <ul style="list-style-type: none">•••												
Waste water collection system <ul style="list-style-type: none">•••												
Wastewater treatment <ul style="list-style-type: none">•••												
Wastewater disposal <ul style="list-style-type: none">•••												
Electric power & Fuel oil <ul style="list-style-type: none">•••												
Transportation <ul style="list-style-type: none">•••												
Communication <ul style="list-style-type: none">•••												

Contingency

Instructor's Notes
Contingency Planning—Page 16
Mitigation Action Plan Prioritization Form

Speaker Notes

1. There is no header or footer on the next page to make it easier to photocopy the form.
2. This blank Mitigation Action Plan Prioritization Form will meet the needs of most rural water utilities in Alaska.
3. If reviewing this form with the class, make note of:
 - All system components in this list might be considered “critical” since they have already been selected out of the Disaster Effects Matrix. It is OK that all are “critical”, but this is a chance to further prioritize if needed.
 - If a component is very new, action items may be delayed on that component, so that older components can be addressed first; or the new item may still be under warranty and the agency that constructed the system may be able to provide an improvement.
 - If there is a plan for replacement of a particular component, then the utility may want to defer any mitigation actions, or make sure that they are included in the improvement.
 - Cost will almost certainly be a factor. These mitigation actions will most likely have to be funded by the utility itself. Grant funding is not likely.

Mitigation Action Plan Prioritization Form

Action Item & system component	How critical? 3 very critical 1 not as critical	Age of component	Planned expansion, replacement, or construction?	Cost of mitigation action?	Take action? Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N
	3 2 1		Y or N	\$	Y or N

Contingency
Planning

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Post Self Assessment

Instructor's Notes

Post-Self Assessment—Page 1

Instructor class preparation

1. Ensure that all participants have their student manuals and have turned to the post-self assessment page.

Materials Needed

General Materials:

1. Student manuals for each student
2. Instructor manual for instructor
3. Pads of paper (legal pads?)
4. Pens or pencils (bring sharpener if using pencils)
5. Highlighters
6. Flipcharts and markers
7. Dry erase markers
8. Overhead projector
9. Transparencies (Printed ones for lesson and blank ones)

Speaker Notes

Slide SA-1

1. Put up the slide SA-1 (which is the self assessment table from the post-self assessment—Page 1) and review how the self assessment works.

Review that:

- There is no grade, it is not a test
- It is a chance for honest reflection on what each participant believes about themselves
- It is OK if they score themselves lower than on the pre-self assessment. That means that they probably actually understand what the skill is now, and know that they are not at the proficiency level they thought they were at when the class started.
- Awareness that there are skills to learn is what is important.

2. Review the terms:

- Not Knowledgeable
- Somewhat Knowledgeable
- Knowledgeable
- Very Knowledgeable

And give examples like: For the skill “Ability to communicate with employees using MSDS”.

- If you have never heard of MSDS before then you are NOT KNOWLEDGEABLE.
 - If you have heard of MSDS before, and know that you can get information from OSHA, then you are SOMEWHAT KNOWLEDGEABLE.
 - If you have been at a worksite that used MSDS sheets before, and you flipped through the binder, but you didn't put the binder together yourself then you are KNOWLEDGEABLE.
 - If you have actually put together an MSDS binder before for a worksite, then you are VERY KNOWLEDGEABLE.
3. Explain that there is a page (table) for each Unit.
 4. Ask if there are any questions, if not then start.

Proficiency level	Proficiency level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency level	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to communicate with employees using MSDS	1	2	3	4
Ability to recognize hazards in the workplace	1	2	3	4
Ability to understand and use MSDS information	1	2	3	4
Ability to determine what safety equipment and training are needed for the job	1	2	3	4
Ability to understand and use the MSDS	1	2	3	4

There are Instructor Notes on Page SA-6 for the follow-up discussion after the self assessment and class expectations and action plan discussions.

POST-SELF ASSESSMENT—PAGE 1

Instructions: The table that starts below and continues on for the next few pages, is the self assessment. Knowledge, skills, and abilities are listed in the left hand column. The knowledge, skills, and abilities are grouped by which unit they are covered in. The proficiency level is listed in the right four columns. Definitions for the proficiency levels are provided in the uppermost table on the page. Circle the number (1, 2, 3, or 4) to the right of the skill that is under the proficiency level that you think best describes your ability for that skill. For example, for the first skill under SAFETY, which is "Ability to write a safety policy for the utility;" If you do not know how to do this, or do not know where to get the information to do this, then circle the number "1" next to the right of that skill. If you know how to write a safety policy, and have actually written one before, then circle the number "4" to the right of that skill.

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

SAFETY

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to assess hazards in the workplace	1	2	3	4
Ability to mitigate hazards in the workplace	1	2	3	4
Ability to communicate hazards with employees using MSDS	1	2	3	4
Ability to determine what safety equipment and training are needed for the utility	1	2	3	4
Ability to write a safety policy for the utility	1	2	3	4

Post-Assess

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PRE-SELF ASSESSMENT—PAGE 2

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

SCHEDULING WORK

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to develop a list of routine tasks that need to be accomplished daily, weekly, or monthly at the water treatment plant.	1	2	3	4
Ability to determine how much time is required to accomplish a list of routine tasks for the water treatment plant.	1	2	3	4
Ability to assign tasks to staff members and balance the workload.	1	2	3	4
Ability to fill out a work order for non-routine tasks.	1	2	3	4
Ability to schedule a work order and track it to completion of the work.	1	2	3	4

Post-Assess

This page is intentionally blank

POST-SELF ASSESSMENT—PAGE 3

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

DATA COLLECTION AND REPORTING

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to determine what regulatory data needs to be collected.	1	2	3	4
Ability to determine what operating data needs to be collected.	1	2	3	4
Ability to make a form to collect operating data from the water treatment plant	1	2	3	4
Ability to compare operating data from previous readings to determine if water plant is operating normally.	1	2	3	4
Ability to prepare a monthly report to your council outlining the operation of the utility.	1	2	3	4

Post-Assess

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POST-SELF ASSESSMENT—PAGE 4

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

PUBLIC RELATIONS

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to write a consumer confidence report (CCR).	1	2	3	4
Ability to document and respond to customer complaints and suggestions.	1	2	3	4
Ability to inform the public about the utility.	1	2	3	4
Ability to involve the public in the utility.	1	2	3	4

Post-Assess

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POST-SELF ASSESSMENT—PAGE 5

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

INVENTORY CONTROL

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to determine what supplies to account for in an inventory control system.	1	2	3	4
Ability to catalog existing supplies either on paper or in a computer database system.	1	2	3	4
Ability to determine the appropriate amount of supplies to keep in stock.	1	2	3	4
Ability to use a paper or computer based system to monitor the use of supplies.	1	2	3	4
Ability to determine whether a computer should be used to track inventory.	1	2	3	4

Post-Assess

Instructor's Notes

Post-Self Assessment—Page 6

Speaker Notes

When everyone has completed the self assessment, then start the discussion

Post-self assessment review

1. Start by asking what they thought of the self assessment in general.
 - Did the scores go up or down?
2. Ask the class if they would like to review the self assessment page by page (Unit by Unit) or as a whole? Proceed with the review in the manner the class prefers.
3. Ask the class if anyone rated themselves a “4” on any skill that they didn’t rate a 4 on the pre-self assessment. If someone says “yes”, then ask them to share with the rest of the class an example of when they used this skill in class. The sharing of information between participants, especially their experiences using these skills, will probably be one of the most valuable pieces of this course.
4. If there were no “4’s”, then ask if there were any “3’s”. If there are any “yeses” then ask those to share their experiences about how they became knowledgeable about that skill. If there were 4’s then skip the 3’s and go on to the next bullet.
5. Does anyone still rate themselves a “1” on any skills. Ask what could have been done in the class so that that person did not rate themselves as a “1”.

Class Expectations

1. Review the list of class expectation.
2. Were all of the class expectations met?
3. If not, ask the class what could have been done differently so that the expectations were met.

Proceed to the Action Plans in the next section

POST-SELF ASSESSMENT—PAGE 6

	Proficiency Level			
	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Proficiency definitions	Does not know how to perform skill or where to find information on skill.	Does not know exactly how to perform skill, but does know where to find information.	Knows how to perform skill, but has never actually done it.	Knows how to perform skill and had done it before.

CONTINGENCY PLANNING

Knowledge, skill or ability	Not Knowledgeable	Somewhat Knowledgeable	Knowledgeable	Very Knowledgeable
Ability to develop a list of hazards that can affect the utility.	1	2	3	4
Ability to list the component systems of the utility.	1	2	3	4
Ability to list the effects of disaster hazards on utility system components.	1	2	3	4
Ability to establish performance goals for the utility during an emergency.	1	2	3	4
Ability to determine what action items to include in a mitigation plan.	1	2	3	4
Ability to write an emergency response plan.	1	2	3	4

Post-Assess

Instructor's Notes

Action Plan

Speaker Notes

1. Use this Action Plan section as a quick review of the whole course. Remind the participants what was covered, namely:
 - Safety
 - Scheduling Work
 - Data Collection and Reporting
 - Public Relations
 - Inventory Control
 - Contingency Planning
2. Have the participants review their Action Plans from each individual unit. They should have listed at least one, and not more than three things that they learned in each unit that they would like to try to accomplish when they get back to the village. The participants should pick at least one item, and not more than three, from their end of unit Action Plans to include on this final action plan. *(If there is more than one participant from a community, they may want to work together on a joint Action Plan. The more people from one community that agrees on a course of action, the more likely it is that the action will be accomplished.)*
3. When they have picked the item(s) that they want to work on, they should list task(s) under that item that they will have to do to accomplish their goal.

For Example

If their goal is to perform a hazard assessment of their water plant, their Action Plan might look like this:

1. First Priority Item: perform hazard assessment of water plant

- Tasks: find copy of "Manager's Handbook" by DOL and make copy of checklist
meet with all utility staff and have a "brainstorming" session about hazards
walk through the water plant with all the staff and use the checklist
combine the lists of hazards from the brainstorming session and the walkthrough
discuss with staff what can be done to minimize or eliminate the hazards.
4. After everyone has completed the Action Plans and tasks, put up a flip chart and list the top Action Plan item for each community so that they can be discussed by the group. This is useful because:
 - It gives the participants a chance to say what they feel and sometimes modify or add to their Actions Plans.
 - It gives the participants a chance to see what other communities are struggling with, what they are doing, and it opens up opportunities for networking between communities.
 - The instructor can take note of what participants are focusing on. This can give a hint at where the training was successful or where more training may be provided.

Action Plan

Now go back and review the action plans from each of the previous 6 units (Safety, Scheduling Work, Data Collection and Reporting, Public Relations, Inventory Control, and Contingency Planning) and pick at least one thing, and no more than three, that you would like to implement when you get back to your village. Then below each item you would like to accomplish, list out tasks that you need to do to accomplish your goals.

1. First Priority Item: _____

- Tasks: _____

2. Second Priority Item: _____

- Tasks: _____

3. Third Priority Item: _____

- Tasks: _____

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Appendix 1

The Manager's Handbook,

**A Reference for Developing a Basic
Occupational Safety and Health Program for
Small Businesses**

**Alaska Department of Labor and Workforce Development
Division of Labor Standards and Safety,
Occupational Safety and Health**

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The Manager's Handbook

***A Reference for Developing a Basic Occupational Safety and Health Program for
Small Businesses***

State of Alaska
Department of Labor & Workforce Development
Division of Labor Standards & Safety
Occupational Safety & Health

This material and Safety and Health Consultation Services are provided free of charge to owners, proprietors, and managers of small businesses by the State of Alaska, Department of Labor and Workforce Development under a program funded largely by the Occupational Safety and Health Administration (OSHA), an agency of the U.S. Department of Labor.

STATE OF ALASKA
Tony Knowles, Governor

Introduction

This guide is published by the State of Alaska, Department of Labor & Workforce Development, Division of Occupational Safety and Health. Its purpose is to help you establish and maintain an effective safety and health program. It is designed particularly for the smaller business organization.

The information is based upon principles and techniques developed by national and international professionals. It is not intended as a legal interpretation of any government regulation or industry standard.

Accidents and disease at a place of employment affect both the lives of the employees and the well being of the employer's business. Occupational safety and health not only involves the technical aspects of the work in the places of employment but is also affected by individual attitudes and actions of every manager, supervisor and employee.

Section I: Basis for a Safety and Health Program

Most business owners could be perceived as risk-takers, willing to pit their business against others in a very competitive world. However, there is one gamble that is a sure loss for a business owner: a gamble on safety and the risk of accidents that cause injury or disease to employees or damage to property.

Accidents Cost Money

Safety and health organizations, small business owners and major corporations have come to realize that the actual cost of a lost workday injury is grossly underestimated. For example, consider the indirect and hidden costs of one lost workday injury:

1. Productive time lost by the injured employee;
2. Productive time lost by employees and supervisors attending the accident victim;
3. Clean-up and start-up of operations interrupted by the accident;
4. Time to hire and retrain other individuals to replace the injured employee until his or her return;
5. Time and cost for repair or replacement of any damaged equipment or materials; perhaps the cost of losing a valued customer due to poor performance or late deliver of goods and services;
6. Eroded morale among employees and perhaps lower efficiency;
7. Increase worker's compensation assessment rates;
8. Possible penalties or other sanctions applied where the injury or illness is determined to be caused by a violation of regulations; and
9. The cost of completing the paperwork generated by the accident.

It makes good business sense to reduce the costs and risks associated with accidents, whether they cause workplace injuries or illnesses or not. To do that, you must set a goal – to provide a service or produce a quality product efficiently without occupational accidents or illness. Too often that is seen as something to be considered as time permits, over and above regular business activities. To reduce risks effectively, you must address safety and health right along with production, quality control and costs. After all, the costs involved in items (1) through (9) above must come straight out of business profits.

Why a Safety and Health Program?

A “visible” safety and health program generates a safety attitude in employees. Periodic safety and health related training and inspections by those higher up in the organization help to convince the employee that the program is not merely administrative “eyewash,” but is an item of real concern. The employee gets involved. Once that occurs, employees and mid-level supervisors usually take the initiative and the program evolves into an active force within the organization. At this stage, employees subconsciously develop the habit of planning ahead and examining the safety, production, quality and cost aspects of the task before them. That is the goal. Although the physical safeguarding of the place of employment is a very real factor in occupational safety and health, the mental attitude of the employee is the ultimate key to avoiding accidents.

Plan for Safety and Health

In order to achieve this goal, you, as the employer or manager, must establish a plan for eliminating employee injury and illness and make it a part of the organization's daily operations. The plan should not only consider the organization's immediate needs, but should provide for the ongoing “long lasting employee protections.” Once the plan is designed, it must be followed through and used. As a result, the program will let you anticipate, identify and eliminate conditions or procedures that could result in injuries and illnesses.

What is a Safety and Health Program?

Safety and health programs can take many forms, any of which can be effective. For purposes of simplicity the separate steps or components of a safety and health program can be organized into the following four elements:

1. Management commitment;
2. Danger assessment and control;
3. Planning, rules, and work procedures; and
4. Training.

Each element is reviewed in detail in Section II. Section III provides step-by-step guidance in developing the program.

Section II: Four Essential Elements of a Safety and Health Program

Management Commitment

The manager's attitude toward safety and health shows in every operational decision made and action taken. Employees respond to that attitude. The manager demonstrates commitment, or lack of it, by the priority placed on the related issues.

What Constitutes Management Commitment?

Your commitment to protect employees from workplace dangers is reflected in all aspects of your safety and health program, but nowhere more than in its organization and management. To leave no doubt about your personal convictions that the subject is every bit as important as productivity and quality, you must combine safety and health with these other business functions. For example, the following kinds of actions will show employees that you are serious about creating and maintaining a safer workplace:

- 1) Set measurable objectives and goals for safety and health in the same way objectives for other business functions such as sales or productivity are set.
- 2) Assign safety and health responsibilities to staff, just as production responsibilities are assigned.
- 3) Hold supervisors and employees accountable for their safety and health responsibilities.
- 4) Allocate sufficient company resources for:
 - a) identification and control of dangers and potential dangers;
 - b) the establishment of standard operating procedures including safety and health;
 - c) the installation of engineering controls;
 - d) personal protective equipment;
 - e) employee training; and
 - f) safety and health promotion.
- 5) Establish clear lines of communication by which employees tell of their safety and health concerns;
- 6) Take every opportunity to let employees know of your concern by:
 - a) developing a written safety and health policy, signed by the senior operating manager and ensuring that it is publicized to the point where every employee is aware of it;
 - b) including related topics in meetings and conversations with employees;
 - c) taking any necessary action after inspections or accidents; and
 - d) providing feedback on safety and health performance.
- 7) Set a good example! If, for instance, a requirement for hard hats to be worn in a specific area is present, you will wear a hard hat in that area. Once management and the employees accept safety and health as essential parts of the daily business operations, along with production and quality control, a solid foundation for an effective workplace safety and health program will have been laid. From that point on, continual evidence of your concern is a primary factor in maintaining an effective program. Both employees and managers will benefit from reduced injuries and fewer lost working hours.

Danger Assessment and Control

Danger assessment and control is a vital element in the program. It is a system to identify any existing or potential dangers in the workplace, then following through to eliminate or control them. If dangers occur (or reoccur), there is a breakdown in the danger control system, and in turn the safety and health program. The danger control system also serves as the basis for developing safe work procedures and safety and health training.

Correcting or controlling dangers can be accomplished in a variety of ways. However, to work properly, a danger control system must have the following components:

- 1) An initial danger identification survey;
- 2) A system for danger identification (such as inspections at regular intervals);
- 3) An effective system for employees to report conditions which may be dangerous (such as a safety committee or a safety representative);
- 4) An equipment and maintenance program;
- 5) A system for review or investigation of workplace accidents, injuries and illnesses;
- 6) A system for initiating and tracking danger corrective actions; and
- 7) A system for periodically monitoring the place of employment.

Initial Danger Survey

A knowledgeable safety and health person should conduct the initial safety and health survey (audit) to identify existing or potential workplace dangers.

Periodic Danger Surveys (Monitoring)

Schedule a walk-through of the workplace at regular intervals to ensure that established work procedures are being followed, and those unsafe conditions or practices are identified and promptly corrected. These inspections are in addition to the everyday safety and health checks that are part of the routine duties of supervisors and managers. The frequency of the inspections depends on the type of operations, the magnitude of the dangers, the proficiency of employees and supervisors, changes in equipment or work processes, and the history of the workplace injuries and illnesses. Someone who, through experience or training, can identify actual and potential dangers and who understands safe work procedures should do an inspection.

Employee Reports of Danger

Perhaps the best source of danger information is the employees. Employees should be trained to recognize danger situations and instructed to bring them to the attention of their supervisors or to a safety committee or a safety and health representative.

Prompt attention to identify dangers and positive feedback to employees will reaffirm your personal commitment to workplace safety and health. That will encourage employees to continue to report dangers promptly and assure them that their reporting will not have negative consequences.

Equipment Maintenance Program

Equipment, particularly all safety controls and safety equipment, must be properly maintained. A program must be established to monitor the operation of workplace equipment and make sure that routine preventative maintenance is conducted. That not only makes good safety and health sense, it is good for business. Proper maintenance can prevent costly breakdowns.

Accident Investigations

A system must be established for investigating all workplace accidents, near misses, injuries and illnesses. Someone who can identify the causes and recommend corrective actions should complete the investigation system. It is important to keep records of accident investigations. They can help to determine the types of accidents that occur, where they happen, their causes and any accident trends. Such information is invaluable in preventing future accidents and may also help reveal flaws in operating procedures.

Timely Correction of Dangers

Once remedial measures to control or eliminate dangers have been agreed upon, you should make sure that they are implemented with minimum delay. Interim protection for employees may be necessary until the danger is eliminated or controlled.

Keep a record of steps taken to control or eliminate a danger. Records should contain the danger, who reported it and when who is responsible for correction, the correction target date and when it was corrected. Such information will assist in developing safe work practices and training programs.

Monitoring the Place of Employment

You have the responsibility of monitoring the workplace regularly – the work procedures, equipment and machines – to ensure that all dangers to workers are eliminated or controlled or, alternatively, to ensure that the workers are protected from exposure to the dangers.

Planning, Rules and Work Procedures

Safety and health plans should be part of every business decision, including purchasing, engineering and changes in work processes, as well as planning for emergencies that could arise. Planning for safety and health includes developing general rules for safe conduct and analyzing each job, establishing procedures for doing specific jobs safely, and a system for enforcing safety and health rules.

General Safety Rules

Your firm should have written safety and health rules that apply to everyone. The rules may be very simple or extremely complex, depending on the nature of the work processes and the number and kinds of employees involved. Some items that might be addressed by general safety rules are:

- 1) Personal protective equipment requirements;
- 2) Clothing appropriate for the work;
- 3) Behavior expected of all employees;
- 4) How to leave the workplace safely, with particular reference to emergency procedures; and
- 5) Danger areas that are “off-limits” for employees.

As part of the initial safety and health survey existing rules should be evaluated. New rules may be necessary. All rules should be reviewed and updated periodically to make sure they reflect present conditions. Those no longer applicable should be dropped.

Standard Work Procedures

Effectiveness in safety and health performance results in the employer’s commitment to establish standard work procedures that fix accountability. These directives or standard work procedures can be verbal or written but should be communicated to each worker, defining specific responsibilities and objectives where safety and health are concerned.

It is not uncommon in business operations for individual groups such as quality control, production control, safety and other groups to have their own procedures for doing the same work. The objective is to use results of a work analysis to establish one standard procedure for each job, which is on record and available for reference and continued use.

Ideas can often be obtained from equipment and tool manufacturers. It is strongly recommended that you consult with employees and use their ideas, particularly those employees who have experience in the work being studied.

Standard work procedures provide the tools for teaching how to work consistently with a maximum of efficiency and safety.

Enforcement Procedures and Systems

Safety rules and work procedures must be practiced and enforced. Establish a system to ensure that violations of rules are dealt with fairly but firmly, that all employees are aware of the requirements, and that reorientation or retraining is provided when needed. Incentive programs are useful when used in conjunction with a good enforcement program.

Emergency Procedures

Advanced planning and preparation for emergencies is good insurance. Some emergency planning is mandated by regulations, such as for first aid and fire evacuation and for certain situations in specific industries or operations. A list of possible emergencies should be prepared and procedures established to respond to the emergency. Review the plans with individuals such as doctors, fire and explosive experts or special consultants where possible. Emergency procedures should be updated whenever changes are made in materials, equipment or building structures.

Training

Safety and health training imparts knowledge, generates new ideas, reinforces existing ideas and principles and puts the other three elements of the program into action.

The answer to the question, “How do I get new employees into the mainstream and build productivity?” is “Training!” On-the-job or through formal classroom instruction, training is a necessity for improving performance. As time passes and processes or product lines change, employees must be retrained.

Safety and health training implies training on specific job procedures. It can be given separately, but it is better combined with regularly scheduled job-related training. Such training benefits the employee through fewer work-related injuries and illness reduced stress and worry caused by exposure to dangers. Training must also be provided for supervisors.

Supervisory Training

Training of supervisors is a logical first step since supervisors will help in training the other employees. Supervisors are key figures in the implementation and overall success of the safety and health program. As a minimum, supervisors must be trained in the following areas:

- 1) The need to establish and maintain safe and healthful working conditions;
- 2) The dangers associated with a job, the potential effect on employees, and the rules, procedures and work practices for controlling of these dangers;
- 3) How to relate this information by example and instruction to employees, to ensure that they understand and follow safe procedures; and
- 4) How to investigate accidents, and to take corrective and preventative action to prevent recurrence.

Employee Training

Employees may create dangers through their own actions if they have not been properly trained.

Dangerous situations can be avoided, or made less dangerous if employees receive appropriate training and instruction in subjects like these:

- 1) Standard work procedures including safe work practices, and how these procedures protect against exposure to dangers.
- 2) Personal protective equipment: why it is needed, how to use it, and how to keep it in good condition.
- 3) What to do in case of fire or other emergency that may occur in the workplace.

Training is as essential to the overall program as these elements: management commitment; danger assessment and control; and, safety planning, rules and work procedures.

Section III: Your Safety and Health Program – Suggested Outline for a Safety and Health Plan

Section II described the four essential elements of any safety and health program. As owner or manager you must now concern yourself with the practical problems of putting those elements together and coming up with a program to suit the needs of the workplace. You must determine what steps are necessary then decide how and when each step should be done and who should do it.

Whether you choose to develop the program yourself or to use the expertise of an outside consultant, the following guide can be used. Experts in the field of occupational safety and health have developed this guide.

Management Commitment

- 1) Policy statement:
 - a) may include safety and health goals (objectives of the program); and
 - b) illustrates management involvement by outlining the roles and responsibilities of the employer, the supervisors and the workers.
- 2) Objective:
 - a) based on established priorities; and
 - b) should be measurable with time frames for completion.
- 3) Assignment of responsibility:
 - a) description of duties; and
 - b) establish a policy on accountability.

Danger Assessment and Control

- 1) Danger assessment and correction:
 - a) initial survey or audit;
 - b) periodic surveys and sampling;
 - c) employee reporting of dangers; and
 - d) maintain records of identified dangers and their corrections.
- 2) Accident investigations:
 - a) identification of causes and their correction;
 - b) prevention action; and
 - c) monitoring of workplace injuries and illnesses to ensure that all recommendations are being followed.
- 3) Recordkeeping – the recording of data relating to:
 - a) the nature, frequency and severity of accidents and occupational disease;
 - b) inspection reports by a regulatory agency;
 - c) other inspections;
 - d) accident investigations; and
 - e) environmental monitoring.
- 4) Equipment monitoring and maintenance program:
 - a) Production equipment; and
 - b) Personal protective equipment.

Safety Planning, Rules and Standard Work Procedures

- 1) Control of potential dangers:
 - a) with regard to equipment design, purchasing, engineering, maintenance and production.
- 2) Safety Rules:
 - a) general;
 - b) specific to tasks based on standard work procedures; and
 - c) system for informing employees.
- 3) Work procedures:

- a) analysis of tasks to develop standard work procedures which include safe work practices;
 - b) implementation;
 - c) employee involvement;
 - d) training;
 - e) reporting dangers;
 - f) enforcement of rules; and
 - g) disciplinary procedures.
- 4) Emergency procedures:
- a) first aid;
 - b) emergency medical; and
 - c) fire, evacuation.

Safety and Health Training (Initial Training and Refresher)

- 1) Supervisor:
 - a) Safety and health policy, rules and procedures
 - b) Hazards of the workplace and their control; and
 - c) Accident investigation.
- 2) Employees:
 - a) New-employee orientation;
 - b) General and specific rules;
 - c) Standard work procedures specific to the job;
 - d) Use of personal protective equipment;
 - e) Preparation for emergencies; and
 - f) Training required by regulations.

Assigning Responsibilities

The commitment and dedication of management is the key to making a safety and health program work. The next step is to decide who is the most appropriate person to manage the program. In many cases, the owner is the only likely candidate. Sometimes the plant manager or a ranking member of the management team would be the one to help develop and implement the program.

In selecting the person, consider these questions:

- Does the person have a positive attitude toward change, both personally and for the company?
- Is he or she a good team member and potential team builder?
- Can the individual communicate well?
- Will he or she be committed to the development of an effective safety and health program?
- Can this person be given the authority and resources required to get the job done?
- Does the person have enough time, or can enough time be allocated and dedicated to the program?

The success of the program hinges upon the individual chosen, and he or she cannot succeed without the manager's full cooperation and support.

Regardless of who has been selected to manage the program, the final responsibility for safety and health in the workplace rests upon the manager. To meet it, you must maintain close touch with the program and use your authority to ensure that it follows the intended course.

Getting the Program Started

In some organizations, the individual assigned to the safety and health program may have the skills, knowledge and expertise necessary to accomplish the task. However, some owners feel that a more objective assessment can be obtained from an outside source.

The evaluation of the workplace, conducted by the person responsible for the safety and health program and/or a professional consultant, consists of two major activities.

The first is a comprehensive survey or audit to identify existing or potential safety and health dangers. This initial audit includes such factors as:

- 1) Evaluation of workplace conditions with respect to mandatory requirements (regulations) as well as safety and health procedures generally accepted by the industry.
- 2) An examination of what, how and where dangerous materials are used.
- 3) Direct observations of employee work habits and practices or standard work procedures.
- 4) Discussions with employees and supervisors concerning any safety and health problems with they have experienced.

The second major activity is an assessment of any existing safety and health programs. Look at such things as:

- 1) Company policy statements;
- 2) Rules (both work and safety);
- 3) Guidelines for:
 - a) standard work procedures;
 - b) education and training;
 - c) identification and cataloguing of harmful materials;
 - d) first aid equipment and service;
 - e) medical examinations and health monitoring service;
 - f) emergency evacuation;
 - g) inspections;
 - h) records and statistics; and
 - i) accident investigations;
- 4) Training programs; and
- 5) Guidelines for monitoring the program.

Prioritizing Your Needs

It is hard to make a lot of changes in a business at one time. Improvements are more manageable if they are assigned a level of importance and done in logical order.

Priorities for correcting identified safety and health dangers can be established on the basis of severity of the danger, probability of injury or illness, time needed for correction, and the employee training.

A criterion for prioritizing correction activities can be derived from:

1. The results of the safety and health danger survey or audit.
2. A review of your company's injury and illness records.
3. Available time and resources.
4. Other factors that may affect any specific condition.

Developing an Action Plan

An action plan can serve as a "road map" to get the program from where it is now to where it should be. The action plan sets out what has to be done, the order in which to do it and who is responsible.

The action plan should be specific, yet remain flexible enough to respond to changing needs as program development proceeds.

A good action plan has two parts to it. The first is a list of the major changes or improvements needed to make the safety and health program effective. Assign each a priority and a target date for completion and identify the person who will monitor or direct a project.

The second part of an action plan involves taking each major change or improvement listed, and working out a specific plan for making the change. That means specifying what is to be accomplished, the specific steps required, who would be assigned to do what, and when the task is to be finished. Such a plan will help keep track of program improvements so that details do not slip through the cracks. When several improvements are being made at once, it is easy to overlook something that may be an important prerequisite for the next action.

Implementing Your Plan

The implementation of the action plan begins with the action step that has been assigned the highest priority.

Open communication with employees is crucial to success. Their cooperation depends on their understanding of what the safety and health program is all about, why it is important to them, and how it affects their work.

Remember that a program is a plan put into practice. The program can be kept on track by periodically checking its progress.

Reviewing Your Program

Any good management system requires a periodic review to ensure that the system is operating as intended. Every so often a careful look at each element in your safety and health program should be taken to determine what is working and what changes are needed. Identifying needed improvements provides the basis for new safety and health objectives for the coming year. Developing and implementing new action plans for those improvements will ensure continued progress towards an effective safety and health program. That, in turn, will reduce safety and health risks and increase efficiency and profit.

Safety Inspection Guide

A – Adequate at time of inspection

B – Needs immediate attention

C – Needs consideration

1. JOB SITE INFORMATION	A	B	C
a) Are OSHA and other job-site warning posters posted?			
b) Do you have safety meetings?			
c) Do you have job safety training?			
d) Are there medical services, first aid equipment, stretchers, and qualified first aid available (if needed)?			
e) Are job site injury records being kept as required by OSHA?			
f) Are emergency telephone numbers, such as police department, fire department, doctor, hospital, and ambulance posted?			
2. HOUSEKEEPING AND SANITATION			
a) Are working areas generally neat?			
b) Is waste and trash regularly disposed of?			
c) Is there an enclosed chute provided when material dropped outside of the building from over 20 feet?			
d) Is adequate lighting provided?			
e) Are projecting nails removed or bent over?			
f) Is spilled oil and grease removed?			
g) Are waste containers provided and used?			
h) Are passageways and walkways clear?			
i) Are sanitary facilities adequate and clean?			
j) Is potable water available for drinking?			
k) Are disposable drinking cups and a container for the used cups provided?			
3. FIRE PREVENTION			
a) Has a fire protection program developed?			
b) Have fire instructions been given to personnel?			
c) Are adequate fire extinguishers, identified, checked and accessible?			
d) Are phone numbers of fire department posted?			
e) Are hydrants clear and access open?			
f) Is good housekeeping being practiced?			
g) Are NO SMOKING signs posted and enforced where needed?			
h) Are temporary heating devices safe and is there adequate ventilation?			
4. ELECTRICAL INSTALLATIONS			
a) Is wiring adequate and is it well insulated and grounded, if required?			
b) Are fuses provided?			
c) Are electrical dangers posted?			
d) Are proper fire extinguishers provided?			
e) Are terminal boxes equipped with required covers?			
5. HAND TOOLS			
a) Are proper tools being used for each job?			
b) Are tools neatly stored and carried safely?			
c) Are tools inspected and maintained?			
d) Are damaged tools repaired or replaced promptly? Are employees' tools inspected and repaired?			
6. POWER TOOLS			
a) Is good housekeeping being practiced where tools are used?			
b) Are tools and cords in good condition?			
c) Are tools properly grounded?			

d) Are proper instructions in use?			
e) Are all mechanical safeguards in use?			
f) Are tools neatly stored when not in use?			
g) Is the right tool being used for the job at hand?			
h) Is wiring properly installed?			
7. POWER-ACTUATED TOOLS			
a) Are state and local laws being complied with?			
b) Are all operators licensed?			
c) Are tools and charges protected from unauthorized use?			
d) Is instruction and supervision competent?			
e) Are tools checked and in good working order?			
f) Are tools being used only on recommended materials?			
g) Are safety goggles or face shields being used?			
h) Are flying hazards checked by backing up, removal of personnel, or use of a captive stud tool?			
8. LADDERS			
a) Are ladders inspected and in good condition?			
b) Are ladders spliced?			
c) Are ladders properly secured to prevent slipping, sliding or falling?			
d) Do side rails extend 36" above the top of landing?			
e) Are job-built ladders constructed of sound adequate material?			
f) Are rungs or cleats not over 12" top to top?			
g) Are stepladders fully open when in use?			
h) Are metal ladders not used around electrical hazards?			
i) Are ladders not painted?			
j) Are ladders being properly maintained and stored?			
k) Are safety shoes in use?			
9. SCAFFOLDING			
a) Is erection of scaffolding properly supervised?			
b) Will all structural members meet the safety factors?			
c) Are all connections secured?			
d) Is scaffold tied in to the structure?			
e) Are working areas free of debris, snow, ice and grease?			
f) Are foot sills and mudsills provided?			
g) Are workers protected from falling objects?			
h) Is the scaffold plumb and square, with cross-bracing?			
i) Are guardrails, intermediate rails and toe boards in place?			
j) Is adequate, sound planking in use?			
k) Is scaffold equipment in good working order?			
l) Are ropes and cables in good condition?			
10. HOISTS, CRANES AND DERRICKS			
a) Have cables and sheaves been inspected?			
b) Are slings, chains, hooks and eyes checked?			
c) Is equipment firmly supported?			
d) Are outriggers used if needed?			
e) Are power lines inactivated, removed, or at safe distance?			
f) Is proper loading for capacity at lifting radius? Are rated load capacities posted?			
g) Is all equipment properly lubricated and maintained?			
h) Are signalmen where needed?			
i) Are signals posted, understood and observed?			
j) Are inspection and maintenance logs maintained?			
k) Are hazard signs posted visible to operator?			

11. HEAVY EQUIPMENT			
a) Is there regular inspection and maintenance?			
b) Are moving parts lubricated and repaired?			
c) Are lights, brakes, and warning signals operative?			
d) Are wheels chocked when necessary?			
e) Are haul roads well maintained and laid out properly?			
f) Are shut-off devices on air hose lines in case of hose failure?			
g) Are noise arresters in use?			
h) Are ROPS (roll-over-protections) in place?			
12. MOTOR VEHICLES			
a) Do vehicles receive regular inspection and maintenance?			
b) Are operators qualified?			
c) Are local and state vehicle laws and regulations observed?			
d) Do brakes, lights and warning devices operate properly?			
e) Are weight limits and load sizes controlled?			
f) Are personnel carried in a safe manner?			
g) Is all glass in good condition?			
h) Are back-up signals provided?			
i) Are fire extinguishers installed where required?			
j) Are slow moving vehicle signs posted?			
13. REPAIR SHOPS AND GARAGES			
a) Are fire hazards prevented?			
b) Is dispensing of fuels and lubricants done safely?			
c) Are good housekeeping practices maintained?			
d) Is lighting adequate?			
e) Are carbon monoxide dangers prevented?			
f) Are all fuels and lubricants in proper containers?			
14. BARRICADES			
a) Are floor and wall openings planked over or barricaded?			
b) Are roadways and sidewalks effectively protected?			
c) Is adequate lighting provided?			
d) Is traffic controlled?			
15. HANDLING AND STORAGE OF MATERIALS			
a) Are materials properly stored or stacked?			
b) Are passageways clear?			
c) Are stacks on firm footings and not too high?			
d) Are the proper numbers of men being utilized for each operation?			
e) Are men lifting loads correctly?			
f) Are materials protected from weather conditions?			
g) Is protection against falling into hoppers and bins being used?			
h) Is dust protection observed?			
i) Are extinguishers and other fire protection in the immediate area?			
j) Is traffic controlled in the storage area?			
16. EXCAVATION AND SHORING			
a) Are adjacent structures properly shored?			
b) Is excavation shored or cutback as required?			
c) Are roads and sidewalks supported and protected?			
d) Is material being stored a safe distance from excavation?			
e) Are excavation barricades and adequate lighting provided?			
f) Is equipment a safe distance from edge of excavation?			
g) Are ladders provided where needed?			
h) Are equipment ramps adequate?			

i) Is job supervision adequate?			
17. DEMOLITION			
a) Are operations planned ahead?			
b) Are adjacent structures being properly shored?			
c) Are material chutes used? Are floor openings for material disposal adequately barricaded?			
d) Are there sidewalk and other public protections in place?			
e) Is opening space clear for trucks and other vehicles?			
f) Are there adequate access ladders or stairs?			
18. PILE DRIVING			
a) Are proper storage procedures in place?			
b) Is unloading only by properly instructed workers?			
c) Are steam lines, slings, etc., in operating condition?			
d) Are pile-driving rigs properly supported?			
e) Are ladders on frames?			
f) Are cofferdams maintained and inspected?			
g) Is adequate pumping available?			
19. EXPLOSIVES			
a) Are qualified operators and supervision present?			
b) Are proper transport vehicles used?			
c) Are state and local laws and regulations observed?			
d) Are storage magazines constructed per regulations or as recommended?			
e) Are only experienced personnel handling explosives at all times?			
f) Are cases opened with wooden tools only?			
g) Are "No Smoking" signs posted and observed where appropriate?			
h) Are detonators tested before each shot?			
i) Are all personnel familiar with signals, and are signals properly used at all times?			
j) Are inspections performed after each shot?			
k) Is proper protection being used and are explosives accounted for at all times?			
l) Is disposition of wrappings, waste and scrap being handled properly?			
m) Are nearby residents being advised of blasting cap danger?			
n) Are radio frequency hazards being checked?			
20. FLAMMABLE GASES AND LIQUIDS			
a) Are all containers approved and clearly identified?			
b) Are proper storage practices observed?			
c) Are fire hazards checked?			
d) Are proper types and number of extinguishers nearby?			
e) Are proper methods for moving cylinders used?			
21. WELDING AND CUTTING			
a) Are operators qualified?			
b) Are screens and shield used when needed?			
c) Are goggles, welding helmet, gloves, and other protective clothing being worn?			
d) Is equipment in good operating condition?			
e) Is electrical equipment grounded?			
f) Are power cables and hoses protected and in good repair?			
g) Are fire extinguishers of proper type nearby?			
h) Are fire hazards inspected?			
i) Are flammable materials protected or removed?			
j) Are gas cylinders secured upright?			
k) Are cylinder caps in use?			
22. STEEL ERECTION			
a) Are safety nets or planked floors in use?			

b) Are hard hats, safety belts, gloves and other protective clothing being used?			
c) Are taglines for tools being used?			
d) Are fire hazards at rivet forge and welding operations being checked?			
e) Are floor openings covered or barricaded?			
f) Are ladders, stairs or other access provided?			
g) Are hoisting apparatus routinely checked?			
h) Are employees riding the ball?			
23. CONCRETE CONSTRUCTION			
a) Are forms properly installed and braced?			
b) Are shoring, plumbing and cross-bracing adequate?			
c) Is shoring left in place until strength is attained?			
d) Are proper curing procedures and timing followed?			
e) Are heating devices checked?			
f) Is mixing and transport equipment supported and traffic planned and routed?			
g) Are there adequate runways?			
h) Is adequate protection against cement dust being utilized?			
i) Are hard hats, boots and gloves being used and are shirts covering skin?			
j) Are nails bent over or removed and stripped from material removed from area?			
24. MASONRY			
a) Is proper scaffolding being used?			
b) Are masonry saws properly equipped and grounded, and dust protection provided?			
c) Is hoisting equipment safe?			
25. HIGHWAY CONSTRUCTION			
a) Are laws and ordinances observed?			
b) Are competent flagmen properly dressed, instructed and posted?			
c) Are adequate warning signs and markers being used?			
d) Is right-of-way clear and free of equipment?			
e) Is there traffic control through construction site?			
f) Are detours adequately marked and maintained?			
g) Is dust control present?			
h) Is adequate light present?			
26. PERSONAL PROTECTIVE EQUIPMENT			
a) Is eye protection being used?			
b) Are face shields being used?			
c) Are respirators and masks used?			
d) Are helmets and hoods used?			
e) Is head protection being used?			
f) Is hearing protection being used?			
g) Are gloves, aprons, sleeves (rubber or plastic, designed to afford protection from alkalis and acids) and electricians' rubber gloves and protectors being used?			

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Appendix 2

Security Vulnerability

Self-Assessment Guide

For Small Drinking Water Systems

Association of State Drinking Water Administrators

National Rural Water Association

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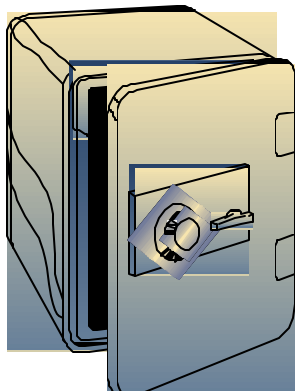
Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems

**Association of State Drinking Water
Administrators**

National Rural Water Association

May 30, 2002

A Note about Security for this Document



This document contains sensitive information about the security of your water system. Therefore, it should be treated as **Confidential Information** and should be stored in a secure place at your water system. A duplicate copy should also be stored in a secure off-site location.

Acknowledgments

This document is the result of collaboration among the Association of Drinking Water Administrators (ASDWA), the U.S. Environmental Protection Agency (U.S. EPA), the U.S. EPA Drinking Water Academy, and the National Rural Water Association (NRWA). We also thank NWRA for the template that was used as the foundation for this project.

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Security Vulnerability Self-Assessment Guide for Small Water Systems

Introduction

Water systems are critical to every community. Protection of public drinking water systems must be a high priority for local officials and water system owners and operators to ensure an uninterrupted water supply, which is essential for the protection of public health (safe drinking water and sanitation) and safety (fire fighting).

Adequate security measures will help prevent loss of service through terrorist acts, vandalism, or pranks. If your system is prepared, such actions may even be prevented. The appropriate level of security is best determined by the water system at the local level.

This Security Vulnerability Self-Assessment Guide is designed to help small water systems determine possible vulnerable components and identify security measures that should be considered. A “vulnerability assessment” is the identification of weaknesses in water system security, focusing on defined threats that could compromise its ability to provide adequate potable water, and/or water for firefighting. This document is designed particularly for systems that serve populations of 3,300 or less. This document is meant to encourage smaller systems to review their system vulnerabilities, but it may not take the place of a comprehensive review by security experts.

The Self-Assessment Guide has a simple design. Answers to assessment questions are “yes” or “no,” and there is space to identify needed actions and actions you have taken to improve security. For any “no” answer, refer to the “comment” column and/or contact your state drinking water primacy agency.

How to Use this Self-Assessment Guide

This document is designed for use by water system personnel. Physical facilities pose a high degree of exposure to any security threat. This self-assessment should be conducted on all components of your system (wellhead or surface water intake, treatment plant, storage tank(s), pumps, distribution system, and other important components of your system).

The Assessment includes an emergency contact list for your use. This list will help you identify who you need to contact in the event of an emergency or threat and will help you develop communication and outreach procedures. Filling out the Emergency Contact List is an important step toward developing an Emergency Response Plan, which provides detailed procedures on how to respond to an emergency.

You may be able to obtain sample Emergency Response Plans from your state drinking water primacy agency.

Security is everyone’s responsibility. We hope this document helps you to increase the awareness of all your employees, governing officials, and customers about security issues.

Once you have completed this document, review the actions you need to take to improve your system’s security. Make sure to prioritize your actions based on the most likely threats. Please complete the Certificate of Completion on page 27 and return only the certificate to your state drinking water primacy agency. Do not include a full copy of your self-assessment.

Keep this Document

This is a working document. Its purpose is to start your process of security vulnerability assessment and security enhancements. Security is not an end point, but a goal that can be achieved only through continued efforts to assess and upgrade your system.

Don’t forget that this is a sensitive document. It should be stored separately in a secure place at your water system. A duplicate copy should also be retained at a secure off-site location.

Access to this document should be limited to key water system personnel and local officials as well as the state drinking water primacy agency and others on a need-to-know basis.

Security Vulnerability Self-Assessment

Record of Security Vulnerability Self-Assessment Completion

The following information should be completed by the individual conducting the self-assessment and/or any additional revisions.

Name:		
Title:		
Area of Responsibility:		
Water System Name:		
Water System PWSID:		
Address:		
City:		
County:		
State:		
Zip Code:		
Telephone:		
Fax:		
E-mail:		
Date Completed:		
Date Revised:	Signature:	
Date Revised:	Signature:	
Date Revised:	Signature:	
Date Revised:	Signature:	
Date Revised:	Signature:	

Inventory of Small Water System Critical Components

Component	Number & Location (if applicable)	Description
Source Water Type		
Ground Water		
Surface Water		
Purchased		
Treatment Plant		
Buildings		
Pumps		
Treatment Equipment (e.g., basin, clearwell, filter)		
Process Controls		
Treatment Chemicals and Storage		
Laboratory Chemicals and Storage		
Storage		
Storage Tanks		
Pressure Tanks		
Power		
Primary Power		
Auxiliary Power		
Distribution System		
Pumps		
Pipes		
Valves		
Appurtenances (e.g., flush hydrants, backflow preventers, meters)		
Other Vulnerable Points		
Offices		
Buildings		
Computers		
Files		
Transportation/ Work Vehicles		
Communications		
Telephone		
Cell Phone		
Radio		
Computer Control Systems (SCADA)		

Security Vulnerability Self-Assessment for Small Water Systems

General Questions for the Entire Water System

The first 13 questions in this vulnerability self-assessment are general questions designed to apply to all components of your system (wellhead or surface water intake, treatment plant, storage tank(s), pumps, distribution system, and offices). These are followed by more specific questions that look at individual system components in greater detail.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
1. Do you have a written emergency response plan (ERP)?	Yes " No "	<p>It is essential that you have an ERP. If you do not have an ERP, you can obtain a sample from your state drinking water primacy agency. As a first step in developing your ERP, you should develop your Emergency Contact List (see Attachment 2).</p> <p>A plan is vital in case there is an incident that requires immediate response. Your plan should be reviewed at least annually (or more frequently if necessary) to ensure it is up-to-date and addresses security emergencies.</p> <p>You should designate someone to be contacted in case of emergency regardless of the day of the week or time of day. This contact information should be kept up-to-date and made available to all water system personnel and local officials (if applicable).</p> <p>Share this ERP with police, emergency personnel, and your state primacy agency. Posting contact information is a good idea only if authorized personnel are the only ones seeing the information. These signs could pose a security risk if posted for public viewing since it gives people information that could be used against the system.</p>	
2. Is access to the critical components of the water system (i.e., a part of the physical infrastructure of the system that is essential for water flow and/or water quality) restricted to authorized personnel only?	Yes " No "	<p>You should restrict or limit access to the critical components of your water system to authorized personnel only. This is the first step in security enhancement for your water system. Consider the following:</p> <ul style="list-style-type: none"> ♦ Issue water system photo identification cards for employees, and require them to be displayed within the restricted area at all times. ♦ Post signs restricting entry to authorized personnel and ensure that assigned staff escort people without proper ID. 	

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
3. Are facilities fenced, including wellhouses and pump pits, and are gates locked where appropriate?	Yes " No "	<p>Ideally, all facilities should have a security fence around the perimeter.</p> <p>The fence perimeter should be walked periodically to check for breaches and maintenance needs. All gates should be locked with chains and a tamper-proof padlock that at a minimum protects the shank. Other barriers such as concrete "jersey" barriers should be considered to guard certain critical components from accidental or intentional vehicle intrusion.</p>	
4. Are your doors, windows, and other points of entry such as tank and roof hatches and vents kept closed and locked?	Yes " No "	<p>Lock all building doors and windows, hatches and vents, gates, and other points of entry to prevent access by unauthorized personnel. Check locks regularly. Dead bolt locks and lock guards provide a high level of security for the cost.</p> <p>A daily check of critical system components enhances security and ensures that an unauthorized entry has not taken place.</p> <p>Doors and hinges to critical facilities should be constructed of heavy-duty reinforced material. Hinges on all outside doors should be located on the inside.</p> <p>To limit access to water systems, all windows should be locked and reinforced with wire mesh or iron bars, and bolted on the inside. Systems should ensure that this type of security meets with the requirements of any fire codes. Alarms can also be installed on windows, doors, and other points of entry.</p>	
5. Is there external lighting around the critical components of your water system?	Yes " No "	Adequate lighting of the exterior of water systems' critical components is a good deterrent to unauthorized access and may result in the detection or deterrence of trespassers. Motion detectors that activate switches that turn lights on or trigger alarms also enhance security.	
6. Are warning signs (tampering, unauthorized access, etc.) posted on all critical components of your water system? (For example, well houses and storage tanks.)	Yes " No "	<p>Warning signs are an effective means to deter unauthorized access.</p> <p>"Warning - Tampering with this facility is a federal offense" should be posted on all water facilities. These are available from your state rural water association.</p> <p>"Authorized Personnel Only," "Unauthorized Access Prohibited," and "Employees Only" are examples of other signs that may be useful.</p>	
7. Do you patrol and inspect your source intake, buildings, storage tanks, equipment, and other critical components?	Yes " No "	<p>Frequent and random patrolling of the water system by utility staff may discourage potential tampering. It may also help identify problems that may have arisen since the previous patrol.</p> <p>Consider asking your local law enforcement agencies to conduct patrols of your water system. Advise them of your critical components and explain why they are important.</p>	

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
8. Is the area around the critical components of your water system free of objects that may be used for breaking and entering?	Yes " No "	When assessing the area around your water system's critical components, look for objects that could be used to gain entry (e.g., large rocks, cement blocks, pieces of wood, ladders, valve keys, and other tools).	
9. Are the entry points to your water system easily seen?	Yes " No "	<p>You should clear fence lines of all vegetation. Overhanging or nearby trees may also provide easy access. Avoid landscaping that will permit trespassers to hide or conduct unnoticed suspicious activities.</p> <p>Trim trees and shrubs to enhance the visibility of your water system's critical components.</p> <p>If possible, park vehicles and equipment in places where they do not block the view of your water system's critical components.</p>	
10. Do you have an alarm system that will detect unauthorized entry or attempted entry at critical components?	Yes " No "	<p>Consider installing an alarm system that notifies the proper authorities or your water system's designated contact for emergencies when there has been a breach of security. Inexpensive systems are available. An alarm system should be considered whenever possible for tanks, pump houses, and treatment facilities.</p> <p>You should also have an audible alarm at the site as a deterrent and to notify neighbors of a potential threat.</p>	
11. Do you have a key control and accountability policy?	Yes " No "	<p>Keep a record of locks and associated keys, and to whom the keys have been assigned. This record will facilitate lock replacement and key management (e.g., after employee turnover or loss of keys). Vehicle and building keys should be kept in a lockbox when not in use.</p> <p>You should have all keys stamped (engraved) "DO NOT DUPLICATE."</p>	
12. Are entry codes and keys limited to water system personnel only?	Yes " No "	Suppliers and personnel from co-located organizations (e.g., organizations using your facility for telecommunications) should be denied access to codes and/or keys. Codes should be changed frequently if possible. Entry into any building should always be under the direct control of water system personnel.	
13. Do you have a neighborhood watch program for your water system?	Yes " No "	Watchful neighbors can be very helpful to a security program. Make sure they know whom to call in the event of an emergency or suspicious activity.	

Water Sources

In addition to the above general checklist for your entire water system (questions 1-13), you should give special attention to the following issues, presented in separate tables, related to various water system components. Your water sources (surface water intakes or wells) should be secured. Surface water supplies present the greatest challenge. Typically they encompass large land areas. Where areas cannot be secured, steps should be taken to initiate or increase law enforcement patrols. Pay particular attention to surface water intakes. Ask the public to be vigilant and report suspicious activity.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
14. Are your wellheads sealed properly?	Yes " No "	A properly sealed wellhead decreases the opportunity for the introduction of contaminants. If you are not sure whether your wellhead is properly sealed, contact your well drilling/maintenance company, your state drinking water primacy agency, your state rural water association, or other technical assistance providers.	
15. Are well vents and caps screened and securely attached?	Yes " No "	Properly installed vents and caps can help prevent the introduction of a contaminant into the water supply. Ensure that vents and caps serve their purpose, and cannot be easily breached or removed.	
16. Are observation/test and abandoned wells properly secured to prevent tampering?	Yes " No "	All observation/test and abandoned wells should be properly capped or secured to prevent the introduction of contaminants into the aquifer or water supply. Abandoned wells should be either removed or filled with concrete.	
17. Is your surface water source secured with fences or gates? Do water system personnel visit the source?	Yes " No "	Surface water supplies present the greatest challenge to secure. Often, they encompass large land areas. Where areas cannot be secured, steps should be taken to initiate or increase patrols by water utility personnel and law enforcement agents.	

Treatment Plant and Suppliers

Some small systems provide easy access to their water system for suppliers of equipment, chemicals, and other materials for the convenience of both parties. This practice should be discontinued.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
18. Are deliveries of chemicals and other supplies made in the presence of water system personnel?	Yes " No "	Establish a policy that an authorized person, designated by the water system, must accompany all deliveries. Verify the credentials of all drivers. This prevents unauthorized personnel from having access to the water system.	
19. Have you discussed with your supplier(s) procedures to ensure the security of their products?	Yes " No "	Verify that your suppliers take precautions to ensure that their products are not contaminated. Chain of custody procedures for delivery of chemicals should be reviewed. You should inspect chemicals and other supplies at the time of delivery to verify they are sealed and in unopened containers. Match all delivered goods with purchase orders to ensure that they were, in fact, ordered by your water system. You should keep a log or journal of deliveries. It should include the driver's name (taken from the driver's photo I.D.), date, time, material delivered, and the supplier's name.	

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
20. Are chemicals, particularly those that are potentially hazardous or flammable, properly stored in a secure area?	Yes " No "	<p>All chemicals should be stored in an area designated for their storage only, and the area should be secure and access to the area restricted. Access to chemical storage should be available only to authorized employees.</p> <p>You should have tools and equipment on site (such as a fire extinguisher, drysweep, etc.) to take immediate actions when responding to an emergency.</p>	
21. Do you monitor raw and treated water so that you can detect changes in water quality?	Yes " No "	<p>Monitoring of raw and treated water can establish a baseline that may allow you to know if there has been a contamination incident.</p> <p>Some parameters for raw water include pH, turbidity, total and fecal coliform, total organic carbon, specific conductivity, ultraviolet adsorption, color, and odor.</p> <p>Routine parameters for finished water and distribution systems include free and total chlorine residual, heterotrophic plate count (HPC), total and fecal coliform, pH, specific conductivity, color, taste, odor, and system pressure.</p> <p>Chlorine demand patterns can help you identify potential problems with your water. A sudden change in demand may be a good indicator of contamination in your system.</p> <p>For those systems that use chlorine, absence of a chlorine residual may indicate possible contamination. Chlorine residuals provide protection against bacterial and viral contamination that may enter the water supply.</p>	
22. Are tank ladders, access hatches, and entry points secured?	Yes " No "	<p>The use of tamper-proof padlocks at entry points (hatches, vents, and ladder enclosures) will reduce the potential for of unauthorized entry.</p> <p>If you have towers, consider putting physical barriers on the legs to prevent unauthorized climbing.</p>	
23. Are vents and overflow pipes properly protected with screens and/or grates?	Yes " No "	Air vents and overflow pipes are direct conduits to the finished water in storage facilities. Secure all vents and overflow pipes with heavy-duty screens and/or grates.	
24. Can you isolate the storage tank from the rest of the system?	Yes " No "	<p>A water system should be able to take its storage tank(s) out of operation or drain its storage tank(s) if there is a contamination problem or structural damage.</p> <p>Install shut-off or bypass valves to allow you to isolate the storage tank in the case of a contamination problem or structural damage.</p> <p>Consider installing a sampling tap on the storage tank outlet to test water in the tank for possible contamination.</p>	

Distribution

Hydrants are highly visible and convenient entry points into the distribution system. Maintaining and monitoring positive pressure in your system is important to provide fire protection and prevent introduction of contaminants.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
25. Do you control the use of hydrants and valves?	Yes " No "	Your water system should have a policy that regulates the authorized use of hydrants for purposes other than fire protection. Require authorization and backflow devices if a hydrant is used for any purpose other than fire fighting. Consider designating specific hydrants for use as filling station(s) with proper backflow prevention (e.g., to meet the needs of construction firms). Then, notify local law enforcement officials and the public that these are the only sites designated for this use. Flush hydrants should be kept locked to prevent contaminants from being introduced into the distribution system, and to prevent improper use.	
26. Does your system monitor for, and maintain, positive pressure?	Yes " No "	Positive pressure is essential for fire fighting and for preventing backsiphonage that may contaminate finished water in the distribution system. Refer to your state primacy agency for minimum drinking water pressure requirements.	
27. Has your system implemented a backflow prevention program?	Yes " No "	In addition to maintaining positive pressure, backflow prevention programs provide an added margin of safety by helping to prevent the intentional introduction of contaminants. If you need information on backflow prevention programs, contact your state drinking water primacy agency.	

Personnel

You should add security procedures to your personnel policies.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
28. When hiring personnel, do you request that local police perform a criminal background check, and do you verify employment eligibility (as required by the Immigration and Naturalization Service, Form I-9)?	Yes " No "	It is good practice to have all job candidates fill out an employment application. You should verify professional references. Background checks conducted during the hiring process may prevent potential employee-related security issues. If you use contract personnel, check on the personnel practices of all providers to ensure that their hiring practices are consistent with good security practices.	

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
29. Are your personnel issued photo-identification cards?	Yes " No "	For positive identification, all personnel should be issued water system photo-identification cards and be required to display them at all times. Photo identification will also facilitate identification of authorized water system personnel in the event of an emergency.	
30. When terminating employment, do you require employees to turn in photo IDs, keys, access codes, and other security-related items?	Yes " No "	Former or disgruntled employees have knowledge about the operation of your water system, and could have both the intent and physical capability to harm your system. Requiring employees who will no longer be working at your water system to turn in their IDs, keys, and access codes helps limit these types of security breaches.	
31. Do you use uniforms and vehicles with your water system name prominently displayed?	Yes " No "	Requiring personnel to wear uniforms, and requiring that all vehicles prominently display the water system name, helps inform the public when water system staff is working on the system. Any observed activity by personnel without uniforms should be regarded as suspicious. The public should be encouraged to report suspicious activity to law enforcement authorities.	
32. Have water system personnel been advised to report security vulnerability concerns and to report suspicious activity?	Yes " No "	Your personnel should be trained and knowledgeable about security issues at your facility, what to look for, and how to report any suspicious events or activity. Periodic meetings of authorized personnel should be held to discuss security issues.	
33. Do your personnel have a checklist to use for threats or suspicious calls or to report suspicious activity?	Yes " No "	To properly document suspicious or threatening phone calls or reports of suspicious activity, a simple checklist can be used to record and report all pertinent information. Calls should be reported immediately to appropriate law enforcement officials. Checklists should be available at every telephone. Sample checklists are included in Attachment 3. Also consider installing caller ID on your telephone system to keep a record of incoming calls.	

Information storage/computers/controls/maps

Security of the system, including computerized controls like a Supervisory Control and Data Acquisition (SCADA) system, goes beyond the physical aspects of operation. It also includes records and critical information that could be used by someone planning to disrupt or contaminate your water system.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
34. Is computer access "password protected?" Is virus protection installed and software upgraded regularly and are your virus definitions updated at least daily? Do you have Internet firewall software installed on your computer? Do you have a plan to back up your computers?	Yes " No "	All computer access should be password protected. Passwords should be changed every 90 days and (as needed) following employee turnover. When possible, each individual should have a unique password that they do not share with others. If you have Internet access, a firewall protection program should be installed on your computer. Also consider contacting a virus protection company and subscribing to a virus update program to protect your records. Backing up computers regularly will help prevent the loss of data in the event that your computer is damaged or breaks. Backup copies of computer data should be made routinely and stored at a secure off-site location.	

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
35. Is there information on the Web that can be used to disrupt your system or contaminate your water?	Yes " No "	<p>Posting detailed information about your water system on a Web site may make the system more vulnerable to attack. Web sites should be examined to determine whether they contain critical information that should be removed.</p> <p>You should do a Web search (using a search engine such as Google, Yahoo!, or Lycos) using key words related to your water supply to find any published data on the Web that is easily accessible by someone who may want to damage your water supply.</p>	
36. Are maps, records, and other information stored in a secure location?	Yes " No "	<p>Records, maps, and other information should be stored in a secure location when not in use. Access should be limited to authorized personnel only.</p> <p>You should make back-up copies of all data and sensitive documents. These should be stored in a secure off-site location on a regular basis.</p>	
37. Are copies of records, maps, and other sensitive information labeled confidential, and are all copies controlled and returned to the water system?	Yes " No "	Sensitive documents (e.g., schematics, maps, and plans and specifications) distributed for construction projects or other uses should be recorded and recovered after use. You should discuss measures to safeguard your documents with bidders for new projects.	
38. Are vehicles locked and secured at all times?	Yes " No "	<p>Vehicles are essential to any water system. They typically contain maps and other information about the operation of the water system. Water system personnel should exercise caution to ensure that this information is secure.</p> <p>Water system vehicles should be locked when they are not in use or left unattended.</p> <p>Remove any critical information about the system before parking vehicles for the night.</p> <p>Vehicles also usually contain tools (e.g., valve wrenches) that could be used to access critical components of your water system. These tools should be secured and accounted for daily.</p>	

Public Relations

You should educate your customers about your system. You should encourage them to be alert and to report any suspicious activity to law enforcement authorities.

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
39. Do you have a program to educate and encourage the public to be vigilant and report suspicious activity to assist in the security protection of your water system?	Yes " No "	<p>Advise your customers and the public that your system has increased preventive security measures to protect the water supply from vandalism. Ask for their help. Provide customers with your telephone number and the telephone number of the local law enforcement authority so that they can report suspicious activities. The telephone number can be made available through direct mail, billing inserts, notices on community bulletin boards, flyers, and consumer confidence reports.</p>	

QUESTION	ANSWER	COMMENT	ACTION NEEDED/TAKEN
40. Does your water system have a procedure to deal with public information requests, and to restrict distribution of sensitive information?	Yes " No "	<p>You should have a procedure for personnel to follow when you receive an inquiry about the water system or its operation from the press, customers, or the general public.</p> <p>Your personnel should be advised not to speak to the media on behalf of the water system. Only one person should be designated as the spokesperson for the water system. Only that person should respond to media inquiries. You should establish a process for responding to inquiries from your customers and the general public.</p>	
41. Do you have a procedure in place to receive notification of a suspected outbreak of a disease immediately after discovery by local health agencies?	Yes " No "	<p>It is critical to be able to receive information about suspected problems with the water at any time and respond to them quickly. Procedures should be developed in advance with your state drinking water primacy agency, local health agencies, and your local emergency planning committee.</p>	
42. Do you have a procedure in place to advise the community of contamination immediately after discovery?	Yes " No "	<p>As soon as possible after a disease outbreak, you should notify testing personnel and your laboratory of the incident. In outbreaks caused by microbial contaminants, it is critical to discover the type of contaminant and its method of transport (water, food, etc.). Active testing of your water supply will enable your laboratory, working in conjunction with public health officials, to determine if there are any unique (and possibly lethal) disease organisms in your water supply.</p> <p>It is critical to be able to get the word out to your customers as soon as possible after discovering a health hazard in your water supply. In addition to your responsibility to protect public health, you must also comply with the requirements of the Public Notification Rule. Some simple methods include announcements via radio or television, door-to-door notification, a phone tree, and posting notices in public places. The announcement should include accepted uses for the water and advice on where to obtain safe drinking water. Call large facilities that have large populations of people who might be particularly threatened by the outbreak: hospitals, nursing homes, the school district, jails, large public buildings, and large companies. Enlist the support of local emergency response personnel to assist in the effort.</p>	
43. Do you have a procedure in place to respond immediately to a customer complaint about a new taste, odor, color, or other physical change (oily, filmy, burns on contact with skin)?	Yes " No "	<p>It is critical to be able to respond to and quickly identify potential water quality problems reported by customers. Procedures should be developed in advance to investigate and identify the cause of the problem, as well as to alert local health agencies, your state drinking water primacy agency, and your local emergency planning committee if you discover a problem.</p>	

Now that you have completed the "Security Vulnerability Self-Assessment Guide for Small Water Systems," review your needed actions and then prioritize them based on the most likely threats. A Table to assist you in prioritizing actions is provided in Attachment 1.

Attachment 1. Prioritization of Needed Actions

Once you have completed the “Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems,” review the actions you need to take to improve your system’s security. Note the questions to which you answered “no” on this worksheet. You can use it to summarize the areas where your system has vulnerability concerns. It can also help you prioritize the actions you should take to protect your system from vulnerabilities. Make sure to prioritize your actions based on the most likely threats to your water system.

Question Number	Needed Action	Scheduled Completion

Attachment 2. Emergency Contact List

We urge all public water systems to adopt an emergency response plan (ERP). Emergency plans are action steps to follow if a primary source of drinking water becomes contaminated or if the flow of water is disrupted. You can obtain sample ERPs from your state drinking water administrator, or from your state primacy agency.

This sample document is an “Emergency Contact List.” It is an essential part of your ERP. It contains the names and telephone numbers of people you might need to call in the event of an emergency. This is a critical document to have at your disposal at all times. It gives you a quick reference to all names and telephone numbers that you need for support in the case of an emergency.

Filling out this Emergency Contact List reminds you to think about all of the people you might need to contact in an emergency. It also may encourage you to talk with these people about what you and they would do if an emergency were to occur.

Section 1. System Identification

Public Water System (PWS) ID Number		
System Name		
Town/City		
Telephone Numbers	System Telephone	Evening/Weekend Telephone
Other Contact Information	System Fax	Email
Population Served and Number of Service Connections	People Served	Connections
System Owner (The owner must be listed as a person's name)		
Name, title, and telephone number of person responsible for maintaining this emergency contact list	Name and title	Telephone

Section 2. Notification/Contact Information

Local Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)	EMAIL
Fire Department				
Police Department				
FBI Field Office				
Health Department				
Primacy Agency District Office				
Local Hospital				
Local Emergency Planning Committee				
EMS				
Local Pharmacy				
Local Nursing Homes				
Local Schools				
Local Prisons				
Local Government Official				
Local Hazmat Team				
Water System Operator				
Neighboring Water System				
Neighboring Water System				
Other				

Service/Repair Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)	EMAIL
Electrician				
Electric Utility Company				
Gas Utility Company				
Sewer Utility Company				
Telephone Utility Company				
Plumber				
Pump Specialist				
"Dig Safe" or local equivalent				
Soil Excavator/Backhoe Operator				
Equipment Rental (Power Generators)				
Equipment Rental (Chlorinators)				
Equipment Rental (Portable Fencing)				
Equipment Repairman				
Radio/Telemetry Repair Service				
Bottled Water Source				
Bulk Water Hauler				
Pump Supplier				
Well Drillers				
Pipe Supplier				
Chemical Supplier				
Local/Regional Analytical Laboratory				

State Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)	EMAIL
Drinking Water Primacy Agency				
Department of Environmental Protection (or state equivalent)				
Department of Health				
Emergency Management Agency				
Hazmat Hotline				

Media Notification List

ORGANIZATION	CONTACT NAME/TITLE	TELEPHONE (DAY)	TELEPHONE (NIGHT)	EMAIL
Designated Water System Spokesperson				
Newspaper - Local				
Newspaper – Regional/State				
Radio				
Radio				
Radio				
Television				
Television				
Television				

Section 3. Communication and Outreach

Communication

Communications during an emergency poses some special problems. A standard response might be to call “911” for local fire and police departments. But what if your emergency had disrupted telephone lines and over-loaded cell phone lines? Talk with your state drinking water primacy agency about local emergency preparedness and solutions to these problems. Increasingly, state emergency agencies are establishing secure lines of communication with limited access. Learn how you can access those lines of communication if all others fail.

Outreach

If there is an incident of contamination in your water supply, you will need to notify the public and make public health recommendations (e.g., boil water, or use bottled water). To do this, you need a plan.

- C How will you reach all customers in the first 24 hours of an emergency?
- C Appoint a media spokesperson—a single person in your water system who will be authorized to make all public statements to the media.
- C Make arrangements for contacting institutions with large numbers of people, some of whom may be immuno-compromised:
 - Nursing homes
 - Hospitals
 - Schools
 - Prisons

Attachment 3: Threat Identification Checklists

Water System Telephone Threat Identification Checklist

In the event your water system receives a threatening phone call, remain calm and try to keep the caller on the line. Use the following checklist to collect as much detail as possible about the nature of the threat and the description of the caller.

1. Types of Tampering/Threat: <div> <input type="checkbox"/> Contamination <input type="checkbox"/> Threat to tamper </div> <div> <input type="checkbox"/> Biological <input type="checkbox"/> Bombs, explosives, etc. </div> <div> <input type="checkbox"/> Chemical <input type="checkbox"/> Other (explain) </div>				
2. Water System Identification: Name: Address: Telephone: PWS Owner or Manager's Name:				
3. Alternate Water Source Available: Yes/No		If yes, give name and location:		
4. Location of Tampering: <div> <input type="checkbox"/> Distribution Line <input type="checkbox"/> Water Storage Facilities <input type="checkbox"/> Treatment Plant <input type="checkbox"/> Raw Water Source <input type="checkbox"/> Treatment Chemicals </div> <input type="checkbox"/> Other (explain):				
5. Contaminant Source and Quantity:				
7. Date and Time of Tampering/Threat:				
8. Caller's Name/Alias, Address, and Telephone Number:				
9. Is the Caller (check all that apply): <div> <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Foul <input type="checkbox"/> Illiterate <input type="checkbox"/> Well Spoken <input type="checkbox"/> Irrational <input type="checkbox"/> Incoherent </div>				

10. Is the Caller's Voice (check all that apply):	
" Soft	" Calm
" Slurred	" Loud
" Deep	" Nasal
" Old	" High
" Angry	" Laughing
" Clear	" Cracking
" Slow	" Excited
" Rapid	" Young
? Familiar (who did it sound like?)	
? Accented (which nationality or region?)	
11. Is the Connection Clear? (Could it have been a wireless or cell phone?)	
12. Are There Background Noises?	
" Street noises (what kind?)	
" Machinery (what type?)	
" Voices (describe)	
" Children (describe)	
" Animals (what kind?)	
" Computer Keyboard, Office	
" Motors (describe)	
" Music (what kind?)	
" Other	
13. Call Received By (Name, Address, and Telephone Number):	
Date Call Received:	
Time of Call:	
14. Call Reported to:	Date/Time
15. Action(s) Taken Following Receipt of Call:	

Water System Report of Suspicious Activity

In the event personnel from your water system (or neighbors of your water system) observe suspicious activity, use the following checklist to collect as much detail about the nature of the activity.

1. Types of Suspicious Activity:				
<input type="checkbox"/> Breach of security systems (e.g., lock cut, door forced open)		<input type="checkbox"/> Changes in water quality noticed by customers (e.g., change in color, odor, taste) that were not planned or announced by the water system		
<input type="checkbox"/> Unauthorized personnel on water system property.		<input type="checkbox"/> Other (explain)		
<input type="checkbox"/> Presence of personnel at the water system at unusual hours				
2. Water System Identification:				
Name:				
Address:				
Telephone:				
PWS Owner or Manager's Name:				
3. Alternate Water Source Available: Yes/No If yes, give name and location:				
4. Location of Suspicious Activity:				
<input type="checkbox"/> Distribution Line	<input type="checkbox"/> Water Storage Facilities	<input type="checkbox"/> Treatment Plant	<input type="checkbox"/> Raw Water Source	<input type="checkbox"/> Treatment Chemicals
<input type="checkbox"/> Other (explain):				

5. If Breach of Security, What was the Nature of the Breach? " Lock was cut or broken, permitting unauthorized entry. Specify location " Lock was tampered with, but not sufficiently to allow unauthorized entry. Specify location " Door, gate, window, or any other point of entry (vent, hatch, etc.) was open and unsecured Specify location " Other Specify nature and location	
6. Unauthorized personnel on site? Where were these people? Specify location What made them suspicious? " Not wearing water system uniforms " Something else? (Specify) What were they doing?	
7. Please describe these personnel (height, weight, hair color, clothes, facial hair, any distinguishing marks):	
8. Call Received By (Name, Address, and Telephone Number): Date Call Received: Time of Call:	
9. Call Reported to:	Date/Time:
10. Action(s) Taken Following Receipt of Call:	

Disclaimer

This document contains information on how to plan for protection of the assets of your water system. The work necessarily addresses problems in a general nature. You should review local, state, and federal laws and regulations to see how they apply to your specific situation.

Knowledgeable professionals prepared this document using current information. The authors make no representation, expressed or implied, that this information is suitable for any specific situation. The authors have no obligation to update this work or to make notification of any changes in statutes, regulations, information, or programs described in this document. Publication of this document does not replace the duty of water systems to warn and properly train their employees and others concerning health and safety risks and necessary precautions at their water systems.

Neither the Association of State Drinking Water Administrators, the National Rural Water Association, the U. S. Environmental Protection Agency, or the Drinking Water Academy, nor its contractor, The Cadmus Group, Inc., assume any liability resulting from the use or reliance upon any information, guidance, suggestions, conclusions, or opinions contained in this document.

Certification of Completion

A final step in completing the “Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems” is to notify the state drinking water primacy agency that the assessment has been conducted. Please fill in the following information and send this page only to the appropriate state drinking water primacy agency contact so that this certification can be included in the records that the state maintains on your water system.

**Public Water
System (PWS) ID:** _____

System Name: _____

Address: _____

Town/City: _____

State: _____

ZIP Code: _____

Phone: _____

Fax: _____

Email: _____

Person Name: _____

Title: _____

Address: _____

Town/City: _____

State: _____

ZIP Code: _____

Phone: _____

Fax: _____

Email: _____

I certify that the information in this vulnerability assessment has been completed to the best of my knowledge and that the appropriate parties have been notified of the assessment and recommended steps to be taken to enhance the security of the water system. Furthermore, a copy of the completed assessment will be retained at the public water system, in a secure location, for state review as requested.

Signed _____

Date _____

Please send this page only to the attention of the State Drinking Water Primacy Agency.

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Section C

Exercises

List of Exercises

Exercise 0-1.....	Icebreaker
Choice of three Icebreaker exercises for participants to get to know each other better.	
Exercise 1-1.....	Hazard Assessment
Choice of three hazard assessments: use checklist from “Manager’s Handbook”.	
Exercise 1-2.....	MSDS
Review an example MSDS sheet for sodium hypochlorite and answer questions about it.	
Exercise 2-1.....	Muddy River O&M Plan (Task Lists)
For small groups, develop a list of O&M tasks for a Utility based on the description of the facilities.	
Exercise 2-2.....	Muddy River O&M Plan (Schedule Tasks)
Place the tasks developed in Ex 2-1 into a weekly schedule assigned to various staff.	
Exercise 2-3.....	Schedule Work Orders (3 page)
Prioritize a list of 10 work orders and place them into the weekly schedule.	
Exercise 4-2.....	Write a CCR (4 pages)
This exercise contains a sample data dump from ADEC for the fictional “Blue River Water System” for 2005, two pages. Also provided is the completed version of the Blank CCR Form, two pages (use the blank form from Appendix 4).	
Exercise 6-1.....	Emergency Preparedness Case Study (1 page)
A case study of a village situation is read aloud. Class participants are asked to respond how they would react at given times in the event.	
Exercise 6-2.....	Security Vulnerability Assessment
Exercise 6-3.....	Boil Water Notice (2 pages)

Exercise 0-1 Icebreaker

The icebreaker exercise is used to get the class participants to know a little something about each other and the instructor, to build some trust between everyone so that discussions during the rest of the class will be more open and more meaningful.

Icebreaker Exercise Idea 1

Mighty neighborly:

Break into small groups (of two?)

The two people get to know a little something about each other.

At the end, each person will have to introduce the other member of the group to the class saying their name, and whatever else it has been decided that they say about the other member.

Icebreaker Exercise Idea 2

Group resume

Break into groups of three or four.

Each group will develop a “group resume”, listing the unusual skills found in the member of the group. Write the “group resume” on a flip chart and post it on the wall.

As a class, review each of the resumes to discover what a unique and varied group the class is.

Icebreaker Exercise Idea 3

Two truths and a lie

Each participant shall list on a flip chart sheet, in no particular order, two truths and one lie about themselves. They should not disclose what the lie is until the last day of class. Keep the participants guessing.

DO NOT COPY FOR CLASS DISTRIBUTION

Exercise 1-1

Exercise 1-1 Hazard Assessment

This exercise is about how to go about conducting a hazard assessment. You have a choice of conducting a hazard assessment for one of the following scenarios:

1. The facility where the class is being held (either the hotel conference room, tribal center, city office, or where ever this training is being conducted).
2. The water treatment plant that is described below.
3. Your own water treatment plant based on what they remember about the facility.

The Instructor will provide copies of the worksheet from the back of the “Manager’s Handbook” for you to use in performing their hazard assessment.

Mark through items or sections of the worksheet that do not apply.

When all the items on the worksheet have been checked and either categorized or marked through, prioritize the items, picking the ones that are critical that need attention immediately, and noting which ones can be put off until later.

Be prepared to discuss how you would go about addressing the concerns you noted.

Blue River Water Treatment Plant

The village of Blue River, Alaska has a water treatment plant combined with a washeteria that has toilets, showers, and clothes washing machines and dryers. There is no piped water to homes in the village; people haul water from a community water point located on the side of the water treatment plant building.

The water source for the village is the Blue River (surface water). The water plant operator hangs a submersible pump from a raft floating on the river. The raft is tied to trees on the bank with long ropes, and suspended out away from the river bank using an old aluminum ladder. A fire hose runs from the pump to the water treatment plant. There is a large storage tank at the water treatment plant, so the operator only has to pump water from the river 3 or 4 times a year.

The water operator adds a polymer to the water before the water is filtered. The filter is like a big open tank that has a sand bed in it. After the filter, the operator adds chlorine to the water. The operator uses calcium hypochlorite to mix the chlorine solution. After the water is chlorinated it goes to the water storage tank. The operator usually cleans the water storage tank out every other year.

There is a control panel that operates pressure pumps that supply water to the washeteria and community watering point. The washeteria and water treatment plant have separate entrances but have a door that joins them as well.

The building is heated with two oil fired boilers that circulate glycol through baseboard and unit heaters. The fuel oil is stored in a 1,000 gallon tank outside the building.

MAKE 1 COPY FOR EACH PERSON

Exercise 1-2 Sample MSDS—Page 1**Instructions**

Review the MSDS and answer the questions below:

1. This MSDS is for what material?
2. The MSDS contains 20 separate headings. Name 5 of them.
3. What do you do if someone gets this material in their eye?
4. What are you supposed to use to put out a fire that is consuming this material?
5. What protective equipment is recommended for handling this material?
6. What are the concerns about storing this material?

Sample MSDS

FISHER SCIENTIFIC CHEMICAL MF -- C100 250, CALCIUM HYPOCHLORITE

MSDS Safety Information

MSDS Date: 11/03/1997
MSDS Num: CLHQS
Product ID: C100 250, CALCIUM HYPOCHLORITE
MFN: 01
Responsible Party
Cage: 1B464
Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address: 1 REAGENT LANE
City: FAIRLAWN NJ 07410-2802
Info Phone Number: 201-796-7100
Emergency Phone Number: 201-796-7100
Resp. Party Other MSDS No.: ACC# 03990
Chemtrec IND/Phone: (800)424-9300
Review Ind: Y
Published: Y

Contractor Summary

Cage: 1B464
Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
Address: 1 REAGENT LANE
City: FAIRLAWN NJ 07410-2802
Phone: 201-796-7100

MAKE 1 COPY FOR EACH PERSON (PAGES 1-7)

Exercise 1-2 Sample MSDS Page—2

Ingredients

Cas: 7778-54-3
 RTECS #: NH3485000
 Name: CALCIUM HYPOCHLORITE; EINECS/ELINCS: 231-908-7.
 Percent by Wt: 65.
 EPA Rpt Qty: 10 LBS
 DOT Rpt Qty: 10 LBS

Health Hazards Data

Carcinogenicity Inds - NTP: NO
 IARC: NO
 OSHA: NO
 Effects of Exposure: TARGET ORGANS: NONE. EYE: CAUSES EYE BURNS. MAY RESULT IN CORNEAL INJURY. MAY CAUSE CONJUNCTIVITIS. MAY CAUSE BLEPHARITIS 9INFLAMMATION OF THE MARGINS OF THE EYELIDS). SKIN: CAUSES SEVERE BURNS WITH D ELAYED TISSUE DESTRUCTION. INGESTION: MAY CAUSE PERFORMATION OF THE DIGESTIVE TRACT. CAUSES DIGESTIVE TRACT BURNS WITH IMMEDIATE PAIN, SWELLING OF THE THROAT, CONVULSIONS, AND POSSIBLE COMA. INHALATIO N: MAY CAUSE IRRITATION OF THE RESPIRATORY TRACT WITH BURNING PAIN IN THE NOSE AND THROAT, COUGHING, WHEEZING, SHORTNESS OF BREATH AND PULMONARY EDEMA. CHRONIC: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DERMATITIS.
 Explanation Of Carcinogenicity: CAS# 7778-54-3: NOT LISTED BY ACGIH, IARC, NIOSH, NTP, OR OSHA.
 Signs And Symptions Of Overexposure: EYE: CAUSES EYE BURNS. SKIN: CAUSES SEVERE BURNS. INGESTION: CAUSES DIGESTIVE TRACT BURNS WITH IMMEDIATE PAIN, SWELLING OF THE THROAT, CONVULSIONS, AND POSSIBLE COMA. INHALATION: MAY CAUSE BURNING PAI N IN THE NOSE AND THROAT, COUGHING, WHEEZING, SHORTNESS OF BREATH AND PULMONARY EDEMA.
 First Aid: EYES-GET MEDICAL AID IMMEDIATELY. DO NOT ALLOW VICTIM TO RUB OR KEEP EYES CLOSED. EXTENSIVE IRRIGATION IS REQUIRED (30 MINS). SKIN-GET MEDICAL AID IMMEDIATELY. FLUSH SKIN WITH PLENTY OF SOAP & WATER F OR 15 MIN. REMOVE CONTAMINATED CLOTHES/SHOES.INGESTION-DO NOT INDUCE VOMITING. IF VICTIM IS CONSCIOUS, GIVE 2-4 CUPFULS OF MILK/ WATER. NEVER GIVEANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICA L AID IMMEDIATELY. INHALATION-GET MEDICAL AID IMMEDIATELY. REMOVE TO FRESH AIR IMMEDIATELY. IF BREATHING IS DIFFICULT,GIVE OXYGEN. NOTES TO PHYSICIAN-TREAT SYMPTOMATICALLY & SUPPORTIVELY.

Handling and Disposal

Spill Release Procedures: USE PROPER PERSONAL PROTECTIVE EQUIPMENT. VACUUM OR SWEEP UP MATERIAL AND PLACE INTO A SUITABLE DISPOSAL CONTAINER. AVOID GENERATING DUSTY CONDITIONS. REMOVE ALL SOURCES OF IGNITION.
 Waste Disposal Methods: DISPOSE OF IN A MANNER CONSISTENT WITH FEDERAL, STATE, AND LOCAL REGULATIONS. RCRA D-SERIES MAXIMUM CONCENTRATION OF CONTAMINANTS: NONE LISTED. RCRA D-SERIES CHROLNIC TOXICITY REFERENCE LEVELS: NONE L ISTED. RCRA F-SERIES: NONE LISTED. RCRA P-SERIES: NONE LISTED. RCRA U-SERIES: NONE LISTED.
 Handling And Storage Precautions: HANDLING-WASH THOROUGHLY AFTER HANDLING. REMOVE CONTAMINATED CLOTHING & WASH BEFORE REUSE. USE WITH ADEQUATE VENTILATION. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. EMPTY CONTAINERS RETAIN PRODUCT R ESIDUE, (LIQUID &/OR VAPOR), & CAN BE DANGEROUS. KEEP CONTAINER TIGHTLY CLOSED.
 Other Precautions: HANDLING-AVOID CONTACT WITH HEART, SPARKS & FLAME. DO NOT INGEST OR INHALE. KEEP AWAY FROM CLOTHING & OTHER COMBUSTIBLE MATERIALS. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLER, DRILL, GRIND, OR EXPOSE E MPTY CONTAINERS TO HEAT, SPARKS OR OPEN FLAMES. "SEE OTHER INFORMATION"

Exercise 1-2 Sample MSDS Page—3

Fire and Explosion Hazard Information

Flash Point Text: NOT AVAILABLE

Autoignition Temp Text: NOT AV

Lower Limits: NOT AVAILABL

Upper Limits: NOT AVAILABL

Extinguishing Media: COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER UNTIL WELL AFTER FIRE IS OUT. FOR SMALL FIRES DO NOT USE DRY CHEMICALS, CARBON DIOXIDE, HALON OR FOAM. USE WATER ONLY.

Fire Fighting Procedures: AS IN ANY FIRE, WEAR A SELF-CONTAINED BREATHING APPARATUS IN PRESSURE-DEMAND, MSHA/NIOSH (APPROVED OR EQUIVALENT), AND FULL PROTECTIVE GEAR. DURING A FIRE, IRRITATING AND HIGHLY TOXIC GASES MAY BE GENERATED BY THERMAL DECOMPOSITION OR COMBUSTION. OXIDIZER. GREATLY INCREASES THE BURNING RATE OF COMBUSTIBLE MATERIALS.

Unusual Fire/Explosion Hazard: DUST CAN BE AN EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME. CONTAMINATING OR MIXING WITH FOREIGN MATERIALS SUCH AS COMBUSTIBLES, GREASE, AND FUELS CAN CAUSE FIRE. USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS.

Control Measures

Respiratory Protection: FOLLOW THE OSHA RESPIRATOR REGULATIONS FOUND IN 29CFR 1910.134 OR EUROPEAN STANDARD EN 149. ALWAYS USE A NIOSH OR EUROPEAN STANDARD EN 149 APPROVED RESPIRATOR WHEN NECESSARY.

Ventilation: USE PROCESS ENCLOSURE, LOCAL EXHAUST VENTILATION, OR OTHER ENGINEERING CONTROLS TO CONTROL AIRBORNE LEVELS.

Protective Gloves: WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT SKIN EXPOSURE.

Eye Protection: PROTECTIVE EYEGLASSES OR CHEMICAL SAFETY GOGGLES

Other Protective Equipment: WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT SKIN EXPOSURE.

Supplemental Safety and Health: MSDS NAME: CALCIUM HYPOCHLORITE CATALOG NUMBERS: S79945, C100 250, C100 500, C100250, C100500. SYNONYMS: CALCIUM OXYCHLORIDE; LOSANTIN; HYPOCHLOROUS ACID; CALCIUM SALT; LIME CHLORIDE. NFPA RATING: H EALTH=3, FLAMMABILITY=0, REACTIVITY=1; STRONG OXIDIZER.

Physical/Chemical Properties

HCC: D1

Melt/Freeze Pt: =100.C, 212.F

Decomp Temp: =100.C, 212.F

Spec Gravity: 2.35

PH: NOT AVAILABLE

Viscosity: NOT AVAILABLE

Solubility in Water: DECOMPOSES

Appearance and Odor: WHITE, ODOR: STRONG ODOR - CHLORINE-LIKE

Reactivity Data

Stability Indicator: YES ORGANIC SULFIDES, PHENOL.

Stability Condition To Avoid: HIGH TEMPERATURES, INCOMPATIBLE MATERIALS, IGNITION SOURCES, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS.

Materials To Avoid: INCOMPATIBLE WITH AMINES, ANTHRACENE, CARBON, CARBON TETRACHLORIDE, CHARCOAL, ETHYL ALCOHOL, GLYCEROL, GREASE OR OIL, HYDROCHLORIC ACID, IRON OXIDE, MANGANESE OXIDE, MERCAPTANS, METHYL CARBITOL, NITROMETHANE, ORGANIC MATTER

Hazardous Decomposition Products: HYDROGEN CHLORIDE, OXYGEN, CHLORINE.

Conditions To Avoid Polymerization: HAS NOT BEEN REPORTED.

Exercise 1-2 MSDS Page—4

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Toxicological Information

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Toxicological Information: CALCIUM HYPOCHLORITE: ACGIH-NONE LISTED; NIOSH-NONE LISTED; OSHA-FINAL PELs-NONE LISTED. RTECS#: CAS# 7778-54-3: NH3485000. LD50/LC50: CAS# 7778-54-3: ORAL, RAT: LD50 = 850 MG/KG; CARCINOGENICITY: CAS# 7778-54-3: NOT LISTED BY ACGIH, IARC, NIOSH, NTP, OR OSHA. EPIDEMIOLOGY: NO DATA AVAILABLE. TERATOGENICITY: NO INFORMATION AVAILABLE. REPRODUCTIVE EFFECTS: NO INFORMATION AVAILABLE. NEUROTOXICITY: NO INFORMATION AVAILABLE. MUTAGENICITY: NO DATA AVAILABLE. OTHER STUDIES: NO DATA AVAILABLE.

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Ecological Information

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Ecological: ECOTOXICITY: NO DATA AVAILABLE.

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MSDS Transport Information

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Transport Information: US DOT: SHIPPING NAME: CALCIUM HYPOCHLORITE, DRY. HAZARD CLASS: 5.1. UN NUMBER: UN1748. PACKING GROUP: II. IATA: NO INFORMATION AVAILABLE. RID/ADR: NO INFORMATION AVAILABLE. IMO: NO INFORMATION AVAILABLE. CANADA TDG: SHIPPING NAME: CALCIUM HYPOCHLORITE DRY. HAZARD CLASS: 5.1(9.2). UN NUMBER: UN1748. PACKING GROUP: II.

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Regulatory Information

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Sara Title III Information: SECTION 302 (RQ) CAS# 7778-54-3: FINAL RQ = 10 POUNDS (4.54 KG). SECTION 302 (TPQ) NONE OF THE CHEMICALS IN THIS PRODUCT HAVE A TPQ. SARA CODES CAS # 7778-54-3: ACUTE, FLAMMABLE. SECTION 313 NO CHEMICALS ARE REPORTABLE UNDER SECTION 313.

Federal Regulatory Information: TSCA CAS# 7778-54-3 IS LISTED ON THE TSCA INVENTORY. HEALTH & SAFETY REPORTING LIST NONE OF THE CHEMICALS ARE ON THE HEALTH & SAFETY REPORTING LIST. CHEMICAL TEST RULES NONE OF THE CHEMICALS IN THIS PRODUCT ARE UNDER A CHEMICAL TEST RULE. SECTION 12B NONE OF THE CHEMICALS ARE LISTED UNDER TSCA SECTION 12B. TSCA SIGNIFICANT NEW USE RULE NONE OF THE CHEMICALS IN THIS MATERIAL HAVE A SNUR UNDER TSCA. CLEAN AIR ACT: THIS MATERIAL DOES NOT CONTAIN ANY HAZARDOUS AIR POLLUTANTS. THIS MATERIAL DOES NOT CONTAIN ANY CLASS 1 OZONE DEPLETORS. THIS MATERIAL DOES NOT CONTAIN ANY CLASS 2 OZONE DEPLETORS.

State Regulatory Information: CAS# 7778-54-3 CAN BE FOUND ON THE FOLLOWING STATE RIGHT TO KNOW LISTS: CALIFORNIA, NEW JERSEY, FLORIDA, PENNSYLVANIA, MASSACHUSETTS. CALIFORNIA NO SIGNIFICANT RISK LEVEL: NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED.

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Other Information

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Other Information: STORAGE: KEEP AWAY FROM HEAT, SPARKS, AND FLAME. KEEP AWAY FROM SOURCES OF IGNITION. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. KEEP CONTAINER CLOSED WHEN NOT IN USE. STORE IN A TIGHTLY CLOSED CONTAINER. STORE IN A COOL, DRY, WELL-VENTILATED AREA AWAY FROM INCOMPATIBLE SUBSTANCES. **CLEAN WATER ACT: CAS# 7778-54-3 IS LISTED AS A HAZARDOUS SUBSTANCE UNDER THE CWA. NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED AS PRIORITY POLLUTANTS UNDER THE CWA. NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED AS TOXIC POLLUTANTS UNDER THE CWA. OSHA: NONE OF THE CHEMICALS IN THIS PRODUCT ARE CONSIDERED HIGHLY HAZARDOUS BY OSHA.

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Transportation Information

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Responsible Party Code: 1B464
Trans ID NO: 158167
Product ID: C100 250, CALCIUM HYPOCHLORITE
MSDS Prepared Date: 11/03/1997
Review Date: 08/09/2001
MFN: 1
Multiple KIT Number: 0
Review IND: Y
Unit Of Issue: CY

Exercise 1-2 Sample MSDS—Page 5

Type Of Container: CYLINDER

Detail DOT Information

DOT PSN Code: CQQ
DOT Proper Shipping Name: CALCIUM HYPOCHLORITE, DRY OR CALCIUM HYPOCHLORITE MIXTURES DRY
DOT PSN Modifier: WITH MORE THAN 39 PERCENT AVAILABLE CHLORINE (8.8 PERCENT AVAILABLE OXYGEN)
Hazard Class: 5.1
UN ID Num: UN1748
DOT Packaging Group: II
Label: OXIDIZER
Special Provision: A7,A9,N34
Packaging Exception: 152
Non Bulk Pack: 212
Bulk Pack: NONE
Max Qty Pass: 5 KG
Max Qty Cargo: 25 KG
Vessel Stow Req: D
Water/Ship/Other Req: 48,56,58,69,106,118

Detail IMO Information

IMO PSN Code: DKH
IMO Proper Shipping Name: CALCIUM HYPOCHLORITE MIXTURE, DRY
IMO PSN Modifier: ,WITH MORE THAN 39% AVAILABLE CHLORINE (8.8% AVAILABLE OXYGEN)
IMDG Page Number: 5137
UN Number: 1748
UN Hazard Class: 5.1
IMO Packaging Group: II
Subsidiary Risk Label: -
EMS Number: 5.1-06
MED First Aid Guide NUM: 741

Detail IATA Information

IATA PSN Code: EYQ
IATA UN ID Num: 1748
IATA Proper Shipping Name: CALCIUM HYPOCHLORITE MIXTURE, DRY
IATA PSN Modifier: WITH MORE THAN 39% AVAILABLE CHLORINE (8.8% AVAILABLE OXYGEN)
IATA UN Class: 5.1
IATA Label: OXIDIZER
UN Packing Group: II
Packing Note Passenger: 509
Max Quant Pass: 5KG
Max Quant Cargo: 25KG
Packaging Note Cargo: 512

Detail AFI Information

AFI PSN Code: EYQ
AFI Proper Shipping Name: CALCIUM HYPOCHLORITE, DRY OR CALCIUM HYPOCHLORITE MIXTURES, DRY
AFI PSN Modifier: ,WITH MORE THAN 39% AVAILABLE CHLORINE (8.8% AVAILABLE OXYGEN)
AFI Hazard Class: 5.1
AFI UN ID NUM: UN1748
AFI Packing Group: II
Special Provisions: P5, A7, A9, N34
Back Pack Reference: A9.8

Exercise 1-2 Sample MSDS Page—6

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HAZCOM Label

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Product ID: C100 250, CALCIUM HYPOCHLORITE

Cage: 1B464

Company Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV

Street: 1 REAGENT LANE

City: FAIRLAWN NJ

Zipcode: 07410-2802

Health Emergency Phone: 201-796-7100

Label Required IND: Y

Date Of Label Review: 08/09/2001

Status Code: A

Origination Code: F

Eye Protection IND: YES

Skin Protection IND: YES

Signal Word: DANGER

Respiratory Protection IND: YES

Health Hazard: Severe

Contact Hazard: Moderate

Fire Hazard: None

Reactivity Hazard: Slight

Hazard And Precautions: EMERGENCY OVERVIEW: APPEARANCE: WHITE. DANGER! STRONG
OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE A FIRE. CORROSIVE. MAY BE
HARMFUL IF SWALLOWED. CAUSES EYE AND SKIN BURNS. MAY CAUSE SEVERE RESPIR
ATORY TRACT IRRITATION WITH POSSIBLE BURNS. MAY CAUSE SEVERE DIGESTIVE TRACT
IRRITATION WITH POSSIBLE BURNS. TARGET ORGANS: NONE KNOWN.

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information is formulated for use by elements of the Department of Defense.
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nor any person or persons contracting with any instrumentality of the United
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utilizing this instruction who is not a military or civilian employee of the
United States of America should seek competent professional advice to verify
and assume responsibility for the suitability of this information to their
particular situation regardless of similarity to a corresponding Department
of Defense or other government situation.

** This MSDS was downloaded from the <http://hazard.com> web site **

Exercise 1-2 Sample MSDS—Page 7**Answers to Instructions**

Review the MSDS and answer the questions below:

1. This MSDS is for what material?

Calcium Hypochlorite (this is the white powder used in the water treatment plant to mix up a chlorine solution)

2. The MSDS contains 20 separate headings. Name 5 of them.

1. MSDS Safety Information; 2. Contractor Summary; 3. Ingredients; 4. Health Hazards Data; 5. Handling and Disposal; 6. Fire and Explosion Hazard Information; 7. Control Measures; 8. Physical/Chemical Properties; 9. Reactivity Data; 10. Toxicological Information; 11. Ecological Information; 12. MSDS Transport Information; 13. Regulatory Information; 14. Other Information; 15. Transportation Information; 16. Detail DOT Information; 17. Detail IMO information; 18. Detail IATA Information; 19. Detail IFA Information; 20. Hazcom Label.

3. What do you do if someone gets this material in their eye?

Get medical aid immediately. Do not allow victim to rub or keep eyes closed. Extensive irrigation is required (30 mins).

4. What are you supposed to use to put out a fire that is consuming this material?

Cool containers with flooding quantities of water until well after fire is out. For small fires do not use dry chemicals, carbon dioxide, halon or foam. Use water only.

5. What protective equipment is recommended for handling this material?

Respirator, gloves, chemical safety goggles, and protective clothing (apron?).

6. What are the concerns about storing this material?

Concerns are of it igniting. Instructions say to “Keep away from heat, sparks, and flame. Keep away from sources of ignition. Do not store near combustible materials....”

Exercise 2-1 Muddy River O & M Plan

Creating task lists

Instructor Class Preparation

1. This exercise requires some preparation before class begins. There will be supplies you will need. Please read the materials list and get all the items the week before the class.
2. Make photo copies of each of the descriptions of the six units of the Muddy River Water and Sewer Utility.
3. Put an instruction sheet, a description of the utility, and a description for one unit of the utility in each of the six envelopes.
4. Put 12 of the same color index cards in each envelope (put 12 blue cards in one of the envelopes, 12 red cards in one, 12 green cards in one envelope...)
5. Tape the 4 signs on the wall next to each other.

Materials Needed

1. Six photocopies of the instructions for Exercise 2-1 (page2).
2. Six photocopies of the description of the Muddy River Water and Sewer Utility (page 3).
3. One photocopy of each of the six descriptions of the various units of the Water and Sewer Utility.
4. Six large envelopes 8-1/2" x 11".
5. Six different colors of 3 x 5 index cards or 3 x 5 post-it notes.
6. Make 4 signs from 8-1/2 x 11 sheets of paper labeled, DAILY, WEEKLY, MONTHLY, and NON-ROUTINE.
7. A roll of cellophane tape.
8. Photocopies of the Example DAILY, WEEKLY, MONTHLY, and NON-ROUTINE task tables for everyone in the class.

Instructions for the Instructor

1. Break the participants up into six groups.
2. Tell them that they will be developing an O&M Plan for a Water and Sewer Utility, and that each group will work on one part of the Utility.
3. Hand out one of the envelopes to each group.
4. Have them open the envelopes, and then review the directions out loud with them.
5. They are to read the descriptions of their part of the utility, and write down tasks that are needed to operate or maintain the equipment in their area of the utility.
6. They should put Daily, Weekly, Monthly, and Non-Routine tasks on separate index cards.
7. They should also estimate how much time is required for each task and write that down on the card as well (an example is given in the instructions).
8. While the participants are working on the task lists, the instructor should check on each group and answer questions, or provide help or suggestions if needed.
9. When everyone has developed their lists, have the groups tape their cards to the walls beneath the appropriate sign (DAILY, WEEKLY, ...)
10. DISCUSSION: the cards on the wall should create a graphic picture of the tasks required to operate the utility. You should be able to see what areas of the utility require daily, weekly or monthly tasks, by what color cards are under each sign. Add up the times for all the daily tasks. This amount is the minimum amount of time that is required every day to operate this Utility (not included all the weekly, monthly, annual and non-routine tasks. It will probably range anywhere from 2-4 hours depending on how the participants answered the questions.
11. Leave the tasks posted on the wall to use for Exercise 2-2.
12. If you want, hand out the photocopies of the task list from Exercise 2-2 to show as example task lists after you have discussed the tasks that the participants came up with.

DO NOT COPY FOR CLASS DISTRIBUTION

Exercise 2-1 Muddy River O&M Plan

Creating task lists

Instructions

Each of six groups is given a packet containing a description of one or more components of the Muddy River Water and Sewer Utility. The six groups are:

- Group 1 – Water Source & Water Storage
- Group 2 – Water Treatment
- Group 3 – Water Monitoring
- Group 4 – Mechanical and Electrical systems
- Group 5 – Water Distribution and Wastewater collection and treatment
- Group 6 – Washeteria

The descriptions provide information about the various components of the utility and include brief lists of the major equipment in each component.

The packet also contains colored index cards or post-it notes.

Each group shall:

- list tasks that are needed to operate or maintain the equipment
- list daily, weekly, monthly, or non-routine tasks on separate cards
- next to each task estimate an amount of time needed

For example (using a non-water treatment related subject):

Description: To maintain my physical and mental health I have to eat 3 meals a day, get lots of sleep, exercise often, see some movies, go out to eat, and visit my parents out of state. The task lists on 4 separate cards might look like this:

Daily Tasks	
Eat breakfast	30 min
Eat lunch	30 min
Eat dinner	30 min
Sleep	8 hours

Weekly Tasks	
Walk	1 hour
Bike	1 hour
Swim	1 hour
Weight lift	1 hour
Aerobics	1 hour

Monthly Tasks	
See action flick	2 hours
Eat out Mexican	2 hours
See comedy flick	2 hours
Eat out Chinese	2 hours

Non-Routine Tasks	
Fly to Texas	2 weeks

MAKE ONE COPY FOR EACH PERSON

Exercise 2-1 Muddy River O & M Plan

Creating task lists

Community of Muddy River – Water and Sewer Utility

Community Description:

The Community of Muddy River has a population of approximately 500 people and is located on the banks of the Mighty Muddy River in the Interior of Alaska. The community is served by a gravel strip airport, has regular barge service in the summer and is not on the contiguous road system. Community facilities include a school, post office, health clinic, bulk fuel storage facility, general store, electric power plant, community cold storage locker, two churches, community hall, and water treatment plant / washeteria. Local government includes a City Government and Tribal Government. The City Government manages the police, volunteer fire department, roads (public works), and cable TV. AVEC manages the electric utility. The school is a member of the Mighty Muddy School District which includes 6 other communities up and down the river. The local Native Corporation manages the bulk fuel and the general store. The Tribal Government manages the clinic, and the water and sewer utility.

Weather in Interior Alaska consists of extremes. In summer, temperatures can reach the high 90's, while in winter -50 F is common. In Summer many residents leave the community to spend time at their fish camps, while in the Fall they spend their time hunting moose and water fowl.

Water and Sewer Utility facilities description:

- Water Source: 46 ft deep well next to the Mighty Muddy River (considered GWUDISW). The turbidity of the water varies throughout the year with the change of the seasons.
- Water Treatment Plant / Washeteria: 4,500 square foot building containing water treatment equipment, water pressure pumping equipment, lab equipment, mechanical equipment (boilers and ventilation), electrical equipment (pump and ventilation controls), 8 hydronic clothes dryers, 8 clothes washing machines, men's & women's bathrooms each w/ 4 pay showers & public toilets, a community water point, fire truck/water haul truck fill point, and a manager's office.
- Water storage: 200,000 gallon, 24 foot tall, insulated bolted steel tank.
- Water distribution: 1 buried water main loop that provides water to the school and 10 homes between the school and WTP. 5 buildings are provided water with a truck haul system (government buildings). All other residents self-haul water from the washeteria community water point.
- Waste water collection: a gravity sewer main collects waste water from the school, 10 homes, and water treatment plant / washeteria, and delivers it to a lift station. The lift station pumps the waste water through a force main to the waste water treatment lagoon. The government buildings have on-site waste water disposal.
- Waste water treatment: Waste water is treated at a 5 acre 2 cell lagoon. The waste water is discharged to the Muddy River annually.

MAKE ONE COPY FOR EACH PERSON

Exercise 2-1 Muddy River O&M Plan

Creating task lists

Group 1 Muddy River Water and Sewer Utility

Water Source:

46 ft deep well on the bank of the Mighty Muddy River and is considered “ground water under the direct influence of surface water”. The turbidity of the water varies throughout the year with the change of the seasons. Next to the well is a “well house” containing electrical controls for the well pump and heat tapes, and piping and valves. The water transmission line from the well house to the water treatment plant consists of two 1-1/2 inch HDPE lines that circulate water. Heat is added to the circulation line at the water treatment plant. Circulation pump is also in the water treatment plant.

Equipment at the water source (well and well house) includes:

- 1.5 hp submersible pump
- pump controls (with start counter and running time meter), pump operation determined by liquid level in storage tank
- raw water meter
- air relief valve
- heat tape along the drop pipe in the well
- heat tape along the water transmission line to the water treatment plant for use only if line freezes

Water Storage:

Water storage for the utility consists of a 200,000 gallon insulated bolted steel tank, 24 feet tall. The storage tank is located adjacent to the water treatment plant. Water enters the tank via a 2-inch steel pipe after the water treatment process. Water leaves the tank via a 4-inch steel pipe. Heat can be added to the water in the tank if needed via a 1-inch diameter circulation loop with a duplex set of circulation pumps and a heat exchanger. The liquid level of the tank is measured by a pressure transducer.

Equipment associated with the water storage includes:

- insulated bolted steel tank
- heat exchanger and circulation pumps
- pressure transducer
- overflow pipe
- piping and valves going in and out of the tank

MAKE ONE COPY FOR EACH PERSON IN GROUP

Exercise 2-1 Muddy River O & M Plan

Creating task lists

Group 2 Muddy River Water and Sewer Utility

Water Treatment:

Water enters the water treatment plant, passes through a heat exchanger, where it is heated to about 50 F. A polymer is added to the water just prior to a reaction vessel (detention time 20 minutes), before passing through a two multi-media (anthracite, sand, garnet) filters that operate in parallel. The water is chlorinated after the filter before going to the storage tank. The flow rate through the treatment process is about 20 gpm.

The backwash system for the multimedia filters is entirely manual. There are no automated valves or monitoring devices.

The water from the well is slightly hard, so water supplied to the washeteria is softened using an industrial water softener. The water supplied to the watering point and the distribution system is not softened.

Equipment used for water treatment:

- double walled heat exchanger (heating liquid is glycol)
- chemical feed pump (LMI type) for polymer
- polymer solution tank with motorized stirrer
- in-line static mixer
- reaction vessel (This is a big tank that is sized so that it takes the water about 20 minutes to flow through it. During this time, the polymer starts to form flocs. Some settlement occurs in the reaction vessel tank.)
- two multi-media filters operating in parallel (with differential pressure gauges to measure headloss across filters)
- 3 hp backwash pump (uses water from the water storage tank to backwash filters)
- 1.5 hp air blower used for air scour cycle of backwash
- chemical feed pump (LMI type) for chlorine
- chlorine solution tank with motorized stirrer
- industrial water softener with brine tank

Materials:

- polymer dry powder in a poly drum
- sodium hypochlorite dry power in poly drum
- clean grade water softener salt

MAKE ONE COPY FOR EACH PERSON IN GROUP

Exercise 2-1 Muddy River O&M Plan**Creating task lists****Group 3 Muddy River Water and Sewer Utility**Water monitoring:

Regulatory water monitoring requirements include:

- Daily testing of chlorine residual at entry point of water to distribution system
- Turbidity monitoring every 4 hours that water is being treated
- Monthly bacteria water test & distribution chlorine residual test
- Other water quality tests include: nitrate annually; gross alpha radiation every 4 years; VOCs annually; lead and copper annually
- Consumer Confidence Report (CCR) has to be written and submitted annually
- Sanitary Survey has to be conducted every 5 years

Operator has to remain certified at a minimum of OIT (needs 3.0 CEUs every 3 years)

Operational water monitoring requirements include:

- Jar testing to determine optimum polymer dosage for current turbidity conditions

Major equipment in the lab at the water treatment plant includes:

- Hach continuous monitoring turbidimeter on raw water line
- Hach continuous monitoring turbidimeter on treated water line
- Chart recorder which records both turbidimeters on one chart
- Hach colorimeter with reagents for free and total chlorine
- 6 paddle gang stirrer (with all beakers, etc...) for jar testing

MAKE ONE COPY FOR EACH PERSON IN GROUP

Exercise 2-1 Muddy River O & M Plan

Creating task lists

Group 4 Muddy River Water and Sewer Utility

Mechanical & Electrical systems:

Two oil fired boilers provide heat for the building and many of the water system components. The boilers heat glycol that circulates throughout the building to the various heat exchangers, unit heaters, clothes dryer heating elements, and air handling heating elements. In addition two oil fired hot water heaters provide hot water for the washeteria.

Equipment:

- Two 1,342,00 BTU oil fired boilers
- 3 sets of two glycol circulation pumps. 1 set each for the following glycol loops
 - heat exchangers for water treatment and storage
 - building unit heaters and air handling heating element
 - clothes dryer heating elements
- glycol circulation piping
- two 85 gallon oil fired hot water heaters
- 5,000 gallon fuel oil tank located outside adjacent to the building
- 25 gallon fuel oil day tank inside boiler room
- Computer controlled ventilation fans that provide preheated air to the clothes dryers

An emergency generator will automatically turn on if the power goes out.

Equipment:

- 50 KW emergency standby generator

MAKE ONE COPY FOR EACH PERSON IN GROUP

Exercise 2-1 Muddy River O&M Plan

Creating task lists

Group 5 Muddy River Water and Sewer Utility

Water Distribution:

Water pressure is provided by two 3 hp pressure pumps. Two 100 gallon pressure tanks with diaphragm type elastic bladders help maintain pressure pump start intervals. One 5,000 foot 4-inch diameter HDPE water main loop supplies the school and 10 homes. Water is circulated through main with two 1/2 hp pumps in the water treatment plant. Heat can be added at to the water in the water main at the water treatment plant with a heat exchanger. The service lines at the homes are 1-inch diameter HDPE circulating lines. The homes have water meters, but the utility charges a flat rate (no need to read the meters at this time). Water is hauled to 5 government buildings in a poly tank in the back of a pick-up truck.

Water distribution equipment:

- Two 3 hp pressure pumps that operate in lead/lag mode, pump controls (with start counters and running time meters), pressure switches set at 30 – 50 psi.
- Two 100 gallon pressure tanks
- 5,000 feet of 4-inch diameter HDPE buried arctic pipe
- two 1/2 hp circulation pumps (need to be manually alternated)
- heat exchanger
- service lines, water meters, individual circulation pumps at each service
- pick-up truck, with poly tank, water pump
- Coin operated community water point (\$0.25 for 5 gallons)

Waste water collection:

Equipment:

- 2,000 feet of buried 8-inch gravity sewer main, with 6 manholes
- 1 lift station with two 3 hp submersible sewage pumps and controls
- trash basket in lift station catches large objects in waste stream
- 2,000 feet of 3-inch force main from lift station to waste water treatment lagoon

Waste water treatment:

Lagoon is discharged annually to Muddy River by opening a valve. Daily monitoring of BOD and TSS are required while discharging.

Equipment: (currently no aeration)

- 5 acre, 2-cell waste water treatment lagoon
- 1,500 feet of 4-inch diameter HDPE discharge line from lagoon to river

MAKE ONE COPY FOR EACH PERSON IN GROUP

Exercise 2-1 Muddy River O & M Plan**Creating task lists****Group 6 Muddy River Water and Sewer Utility**Washeteria:

The washeteria portion of the building (approximately half of the 4,500 square feet) has hydronically heated dryers, clothes washing machines, men's and women's bathrooms with toilets and showers. The washing machines, dryers, and showers are all coin operated. A wall mounted vending machine sells detergent and dryer sheets. A coin changer is mounted to a wall. There are security video cameras monitoring the changer and the machines and a video recorder in the manager's office.

Equipment:

- 8 clothes dryers, heated with glycol
- 8 clothes washing machines
- 8 coin operated showers (4 in each bathroom)
- coin changer
- vending machine
- video cameras and recorder
- floor buffing machine

MAKE ONE COPY FOR EACH PERSON IN GROUP

Exercise 2-2 & 2-3 Muddy River O&M Plan

Creating a work schedule from the task lists & scheduling work orders

Instructor Class Preparation

1. These exercises build on Exercise 2-1, but can be done as a stand alone exercises if needed.
2. You can either use all the tasks that the six groups compiled in Exercise 2-1, or use the Example task lists provided. The example task lists are based on Exercise 2-1 (and can be used as a review of possible answers for Exercise 2-1 if needed).
3. You should probably be prepared to do these exercise both ways.
4. A solution to Exercise 2-3 has not been provided since answers will vary depending on what priorities the Utility sets. In other words, there are no right or wrong answers as long as one can justify why they made a decision.

Materials Needed

1. Photocopies of blank DAILY, WEEKLY, MONTHLY, & NON-ROUTINE task sheets for each participant (they can be found in the forms section of the Appendix); OR, photocopies of the example DAILY, WEEKLY, MONTHLY & NON-ROUTINE task sheets from Exercise 2-2 for every participant.
2. At least 4 photocopies of the blank weekly schedule form for each participant.
3. Overhead projector.
4. Blank overhead DAILY, WEEKLY, MONTHLY, & NON-ROUTINE task sheets.
5. Overhead pens.
6. Photocopies of the two weekly schedules in Exercise 2-3 for every participant

Instructions for the Instructor

1. If you are using the tasks that the participants came up with in Exercise 2-1, then you may want to compile them onto DAILY, WEEKLY, MONTHLY, & NON-ROUTINE tasks sheets using an overhead projector and the overhead slides so that the participants can fill in their blank sheets as a group, and everyone is starting this exercise with the same task lists and times. Else, hand out the example task lists from this exercise and use them.
2. The participants can work individually, or in the same groups as in Exercise 2-1.
3. The class participants are to take the DAILY, WEEKLY, MONTHLY, & NON-ROUTINE tasks and develop a work schedule for one month using four of the blank weekly schedule forms.
4. Wage rates (including benefits) are given for different categories of employees.
5. There are many ways that the schedule can be arranged and the tasks divided between the categories of employees.
6. Have a class discussion about the questions asked on the Exercise instruction sheet.
7. Exercise 2-3 follows from this exercise. The example weekly schedules from Example 2-3 can be used as a possible answer for the weekly schedules for this exercise.

DO NOT COPY FOR CLASS DISTRIBUTION

Exercise 2-2 Muddy River O & M Plan

Creating a work schedule from the task lists

Instructions

Using the DAILY, WEEKLY, MONTHLY & NON-ROUTINE task lists developed in Exercise 2-1 (or Example tasks lists handed out by the instructor), determine the personnel requirements for the Utility and develop a monthly schedule of tasks. Fill in blank weekly schedules to make a monthly schedule.

Use the schedule to determine a monthly personnel budget to meet the personnel requirements for the Utility given the information below:

- The Utility pays a Manager \$16/hour including benefits.
- The Utility pays a certified operator \$14/hour including benefits.
- The Utility pays an attendant/janitor \$10/hour including benefits.
- The Utility pays a skilled laborer (construction) \$13/hour including benefits.
- The Utility pays an unskilled laborer \$9/hour including benefits.
- Any work over 8 hours in one day, or 40 hours in one week will be considered “overtime” and will be paid at 1-1/2 times the normal hourly rate, with the exception of the Manager who is considered an “exempt” employee.

Answer the following questions as you work through the Exercise:

1. What is the minimum amount of time required on a daily basis to cover *just* the tasks that need to be done every day at the Utility?
2. How many work hours are needed each week to complete *just* the weekly tasks? *Just* the monthly tasks? *Just* the quarterly tasks? *Just* the annual tasks?
3. Do all of these tasks have to be performed by the same person (is the same amount of education or skill required for all the tasks)?
4. Is there a need to employ a full time manager for this utility based on the tasks listed?
5. Is there anytime when the Utility needs to have more than one operator working at a given time according to your schedule?
6. Would you employ an operator to work on the weekends? Why or why not? How much would it cost?
7. How many days a week, and how many hours a day would you recommend the washeteria be open?

MAKE ONE COPY OF PAGES 1-6 FOR EACH PERSON

Exercise 2-2 Muddy River O&M Plan

Creating a work schedule from the task lists

EXAMPLES OF DAILY TASKS		
Room / Equipment	Make sure you...	Time Needed
Well house	<ul style="list-style-type: none"> • Visually inspect for leaks, heat in building, vandalism, etc. • Read and record pump start counts and running time meter • Read and record raw water meter • Read and record electric meter reading 	20 minutes including drive to & fr
Lift Station	<ul style="list-style-type: none"> • Visually inspect for leaks, heat in building, vandalism, etc. • Read and record pump start counts and running time meter • Raise and empty trash basket • Read and record electric meter reading 	30 min including drive to & fr
Water Storage Tank	<ul style="list-style-type: none"> • Visually inspect for leaks, overflow pipe, etc. • Read and record water level in tank 	10 min
Water Treatment Plant Building	<ul style="list-style-type: none"> • Visually inspection for leaks, heat in building, vandalism, etc. • Read and record electric meter reading • Read and record pressure pump start counts and running time meter 	10 min
Water Treatment	<ul style="list-style-type: none"> • Check chlorine residual and record on daily operator log • Read turbidity levels from chart and record on daily operator of • Read and record pressure differential of filters 	<ul style="list-style-type: none"> • 15 min • 10 min • 5 min
Mechanical Room/ Boilers	<ul style="list-style-type: none"> • Visually inspect for leaks, temperatures and proper boiler operation • Read and record glycol pressure • Read and record day tank fuel level 	15 min
Washeteria	<ul style="list-style-type: none"> • Visually for vandalism, heat, leaks, etc. • Change security video tape • Collect coins from washers/dryers/showers/vending machines • Count and roll coins, record income, deposit in safe • Clean link from dryers • Clean toilets and showers • Sweep, mop, take out garbage 	<ul style="list-style-type: none"> • 10 min • 5 min • 15 min • 45 min • 15 min • 2 hours • 1 hour
Office	<ul style="list-style-type: none"> • Return phone calls • Document customer concerns 	30 min
Could be anywhere	<ul style="list-style-type: none"> • Complete work orders 	?

These are examples of tasks that might have to be performed on a daily basis for the Muddy River Water and Sewer Utility that is described in Exercise 2-1.

Exercise 2-2 Muddy River O & M Plan

Creating a work schedule from the task lists

EXAMPLES OF WEEKLY TASKS		
Room / Equipment	Make sure you...	Time Needed
WTP/ chemical injection	<ul style="list-style-type: none"> • Clean out chlorine solution tank and mix new batch • Clean out polymer tank and mix new batch 	<ul style="list-style-type: none"> • 30 min • 30 min
WTP/filters	<ul style="list-style-type: none"> • Backwash each filter at least weekly if not needed sooner (30 min ea) • Read and record backwash pump start counts and running time meter 	<ul style="list-style-type: none"> • 60 min
WTP/Building	<ul style="list-style-type: none"> • Sweep & mop treatment area, lab, and mechanical room • Take garbage to dump 	<ul style="list-style-type: none"> • 1 hour • 30 min
Fuel tanks	<ul style="list-style-type: none"> • Check and record level of fuel in bulk fuel tanks 	<ul style="list-style-type: none"> • 30 min
Water Distribution	<ul style="list-style-type: none"> • Deliver water to 5 customers 	<ul style="list-style-type: none"> • 4 hours
Lagoon	<ul style="list-style-type: none"> • Inspect lagoon fencing for vandalism 	<ul style="list-style-type: none"> • 30 min
Washeteria	<ul style="list-style-type: none"> • Vacuum/clean clothes dryer heating coils • Buff floor with machine 	<ul style="list-style-type: none"> • 30 min • 1 hour
Office	<ul style="list-style-type: none"> • Attend weekly staff meeting (all employees) 	<ul style="list-style-type: none"> • 30 min

EXAMPLES OF MONTHLY TASKS		
Room / Equipment	Make sure you...	Time Needed
WTP/Regulatory	<ul style="list-style-type: none"> • Take bacteriological water sample and mail to lab • Check and record chlorine residual at sampling point • Complete monthly operator report and mail to ADEC 	30 min
WTP/Treatment	<ul style="list-style-type: none"> • Conduct jar test on raw water • Flush out reactor tank 	<ul style="list-style-type: none"> • 2 hours • 30 min
WTP/Chemicals	<ul style="list-style-type: none"> • Clean chlorine injection point • Add salt to water softener brine solution 	<ul style="list-style-type: none"> • 30 min • 20 min
Mechanical	<ul style="list-style-type: none"> • Check and record pH of glycol • Alternate glycol circulation pumps and record • Start emergency generator and charge battery 	<ul style="list-style-type: none"> • 10 min • 10 min • 20 min
Office	<ul style="list-style-type: none"> • Prepare monthly report to Manager and Council • Draft purchase orders for supplies • Prepare and send bills to piped water customers • Collect bills/deposit checks • Conduct Safety Meeting 	<ul style="list-style-type: none"> • 1 hour • 1 hour • 1 hour • 2 hours • 30 min

These are examples of tasks that might have to be performed on a weekly and monthly basis for the Muddy River Water and Sewer Utility that is described in Exercise 2-1.

Exercise 2-2 Muddy River O&M Plan

Creating a work schedule from the task lists

EXAMPLES OF LESS FREQUENT TASKS		
Room-Equip/ Frequency	Make sure you...	Time Needed
Well house/ Every 3 months	<ul style="list-style-type: none"> Check and record the amperage for the submersible pump Check and record the amperage for the heat tape on the drop pipe 	20 min
WTP/ Every 3 months	<ul style="list-style-type: none"> Check and record the amperage for the pressure pumps Check and record the amperage for the backwash pump Check and record the amperage for the water circulation pumps 	30 min
Lift Station/ Every 3 months	<ul style="list-style-type: none"> Check and record the amperage for the sewage pumps 	10 min
Truck/ Every 3 months	<ul style="list-style-type: none"> Change oil in water delivery truck 	<ul style="list-style-type: none"> 2 hours
WTP/ Annually	<ul style="list-style-type: none"> Collect water samples for testing for nitrates, VOCs, and lead & copper and mail to lab Exercise gate valves Open and inspect filter media (1 hour each filter) 	<ul style="list-style-type: none"> 2 hours 1 hour 2 hours
Water storage tank/ Annually	<ul style="list-style-type: none"> Empty and clean out the water storage tank 	<ul style="list-style-type: none"> 8 hours
Mechanical/ Annually	<ul style="list-style-type: none"> Flush/clean the 3 heat exchangers (well transmission line loop, storage tank loop, distribution loop): 4 hours each heat exchanger Overhaul each boiler (change injectors, fuel filter, clean stack,...): 4 hours each boiler Change oil and fuel filter in emergency generator 	<ul style="list-style-type: none"> 12 hours 8 hours 2 hours
Water Distribution/ Annually	<ul style="list-style-type: none"> Flush water mains 	<ul style="list-style-type: none"> 4 hours
Sewer Collection/ Annually	<ul style="list-style-type: none"> Flush manholes and sewer mains 	<ul style="list-style-type: none"> 4 hours
Lagoon/ Annually	<ul style="list-style-type: none"> Sample lagoon for BOD/TSS and mail to lab Discharge lagoon (requires 2 hours a day for 4 days) 	<ul style="list-style-type: none"> 1 hour 8 hours
Office/ Annually	<ul style="list-style-type: none"> Update Safety Policy Write and distribute Consumer Confidence Report Update Emergency Response Plan 	<ul style="list-style-type: none"> 4 hours 4 hours 4 hours
Training/ Annually	<ul style="list-style-type: none"> Operator attends 10 hours of CEU training to maintain certification (include travel time in estimate) 	<ul style="list-style-type: none"> 3 days

These are examples of tasks that might have to be performed routinely, but on a less frequent basis than monthly for the Muddy River Water and Sewer Utility that is described in Exercise 2-1.

Exercise 2-2 Muddy River O & M Plan
Creating a work schedule from the task lists

DAILY TASKS at:	For week of:						
Make Sure You...	Sun	Mon	Tue	Wed	Thu	Fri	Sat

WEEKLY TASKS		
Make Sure You...	Day of week	✓
	Sunday	
	Monday	
	Tuesday	
	Wednesday	
	Thursday	
	Friday	
	Saturday	

Exercise 2-2 Muddy River O&M Plan

Answers to questions

Personnel Budget: Manager 2 hours/day x 5 days/week x \$16/hour = \$160/week
 Janitor 4 hours/day x 5 days/week x \$10/hour = \$200/week
 Operator 6 hours/day x 5 days/week x \$14/hour = \$420/week
 Total weekly budget = \$160 + \$200 + \$420 = \$780/week
 Annual budget = \$780/week x 52 weeks/year = \$40,560 a year
 (This doesn't include leave and holidays, so will need more)

Answers to the questions asked at the beginning of the Exercise:

1. What is the minimum amount of time required on a daily basis to cover *just* the tasks that need to be done every day at the Utility (excluding work orders)?

7 1/2 hours total needed every day just to cover basic stuff (2 hours of checking up on the water and waste water equipment, 5 hours of cleaning and washeteria duties, 30 minutes of office work).

2. How many work hours are needed each week to complete *just* the weekly tasks? *Just* the monthly tasks? *Just* the quarterly tasks? *Just* the annual tasks?

Weekly: 8 1/2 hours of water and sewer, 1 1/2 hours washeteria, staff meeting 30 min x number of employees = 10 1/2 hours total weekly; **Monthly:** 4 1/2 hours of water and sewer, 5 1/2 hours of office work = 10 hours monthly; **Quarterly:** 3 hours of water and sewer; **Annually:** 52 hours of water and sewer, 5 days training = 40 hours, 12 hours office work = 104 hours annually

3. Do all of these tasks have to be performed by the same person (is the same amount of education or skill required for all the tasks)?

No, but the Utility (the Manager & the Board) has to decide how many people and of what skills are needed to get all the work done, within the budget. In this case, it might be better to employ a separate person to do the cleaning, and maybe have a alternate operator come in occasionally so that he can take over when the operator is at training or on vacation.

4. Is there a need to employ a full time manager for this utility based on the tasks listed?

Breaking down the duties into management, operations, and cleaning, it looks like there are not that many hours needed in the management area, so a full-time manager is probably not needed. Either the operator, or the Tribal Administrator or City Administrator could act as Manager.

5. Is there anytime when the Utility needs to have more than one operator working at a given time according to your schedule (more than 8 hours of work scheduled in one day) ?

No (except the day that the water tank gets cleaned out, which takes 8 hours. That day, the Utility will need an alternate to help with the tank cleaning, or to do the 2 hours of daily work.

6. Would you employ an operator to work on the weekends? Why or why not? How much would it cost?

Answers will vary for each Utility. The Utility has to decide what level of service to provide their customers and how to come up with the revenue to covers the expenses. To have an operator work for 2 hours a day on weekends would cost 2 hours day x 2 days a week x 52 weeks a year x \$14 an hour = \$2,912 a year.

7. How many days a week, and how many hours a day would you recommend the washeteria be open?

Answers will vary for each Utility.

Exercise 2-3 Muddy River O & M Plan

Scheduling Work Orders

Instructions

You are the Tribal Administrator in Muddy River, Alaska and spend a few hours a day working as the Manager of the Muddy River Water & Sewer Utility (as described in Exercise 2-1). You, the water treatment plant operator, and the washeteria janitor have developed the weekly schedules shown on the next two pages (page 2 & 3) as the operation and maintenance plan for the Utility. You were gone during the first week of February on vacation and when you returned you found a stack of work orders on your desk. They had piled up because the water treatment plant operator was also out of town, and the alternate operator only work two hours a day to check on the essential well house, lift station and water treatment plant equipment, because he has another job working on construction for the housing authority. The Tribal office secretary, washeteria janitor, and alternate operator filled out the work requests. Both you and the water treatment plant operator are back in town now so you must work together to prioritize them and schedule them into the weekly schedule, given the information below:

The Muddy River Water and Sewer Utility employs the following people that work the following hours:

- Utility Manager (Tribal Administrator) 2 hours/day
- Water treatment plant operator 6 hours/day
- Washeteria janitor 4 hours/day
- Alternate operator 2 hours/day (only when the primary operator is out of town)

The budget is very tight and you really can not afford to go over the allotted hours per day, unless you take money out of other budget categories like fuel, electricity, and spare parts.

You usually have a staff meeting at 8am on Wednesday mornings, but this week, you go to the water plant and meet with the operator at 10am after he has done his morning rounds. This is when you show him the work orders and you both work out the plan to schedule the work. (All items that need to be ordered can arrive by Wednesday if ordered on Monday.)

Prioritize the following work orders and fit them into the weekly schedule.

Work order description	Estimated operator hours	Estimated parts/materials
1. Water delivery truck has a flat tire: put on spare/repair tire	20 min/1 hour	\$2.00
2. Toilet bowl in men's room leaking: install new wax seal	1 hour	\$20.00
3. Broken window in washeteria: remove, install temp plywood/replace with new window when ordered & it arrives	30 min/30min	\$200.00
4. Boiler #1 not running: troubleshoot	2 hours?	?
5. Shower in lady's room plugged: probe with drain snake	1 hour	\$0.00
6. Coin box on 2 washing machines are jammed: troubleshoot	1 hour?	?
7. Well house door lock broken by vandals: order new lock and replace	1 hour	\$50.00
8. Frozen sewer service line at house #3: thaw out	4 hours?	\$0.00
9. Lift station pump #2 burned out: order new pump and replace	4 hours	\$600.00
10. A truck rammed the gate at the lagoon & broke it: order & replace it	4 hours	\$400.00

Exercise 2-3 Muddy River O & M Plan

Weekly Schedule for the operator (6 hours a day)

DAILY TASKS at: Well/ LS / WTP (~ 2 hours)		For week of: 2nd week of February						
Make Sure You...	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
Well house: Visually inspect for leaks, heat, vandalism; read and record pump starts, time, raw water meter, electric meter		✓	✓	✓	✓	✓		
Lift Station: Visually inspect for leaks, heat, vandalism, read and record pump starts, time, electric meter, raise and empty trash basket		✓	✓	✓	✓	✓		
Water storage tank: Visually inspect for leaks, overflow pipe, read and record water level in tank		✓	✓	✓	✓	✓		
WTP: Visually inspect for leaks, heat, vandalism, read and record electric meter, pressure pump starts and time.		✓	✓	✓	✓	✓		
Treatment: check chlorine residual and record, record turbidity results from chart, read and record filter pressure differential.		✓	✓	✓	✓	✓		
Mechanical: visually inspect for leaks, temperatures, boilers operating, read and record glycol pressure, read and record day tank fuel level		✓	✓	✓	✓	✓		
WEEKLY TASKS								
Make Sure You...	Day of week						✓	
<i>Note: Weekly tasks for this example total 4 hours/day so that the operator works a total of 6 hours a day.</i>				Sunday				
Deliver water to 5 customers [4 hours]				Monday		✓		
Backwash each filter [1 hour]; clean and fill chemical tanks [1 hour]; check bulk fuel and lagoon [1 hour]; Complete work orders [1 hours]				Tuesday		✓		
Staff meeting [1/2 hour]; Complete a monthly task [wk #1: water sampling, flush tank; wk #2 jar test; wk # 3 Ch injector & brine; wk #4 boilers & generator = 1-2 hours]; Complete work orders [1 1/2 –2 1/2 hours]				Wednesday		✓		
Quarterly or annual Task [2-4 hours]; Complete work orders [0-2 hours]				Thursday		✓		
Sweep, mop, water treatment plant & take out garbage [1 1/2 hour] Complete work orders [3 1/2 hours]				Friday		✓		
<i>Note: There are between 6 and 9 hours allowed to complete work orders during the week depending on monthly, quarterly or annual tasks chosen.</i>				Saturday				

Exercise 2-3 Muddy River O & M Plan

Weekly Schedule for the manager (2 hour/day) & janitor (4 hour/day)

DAILY TASKS at: Office (~ 1 1/2 hours); Washeteria (3 1/2 hours)	For week of: a four week cycle						
Make Sure You...	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Manager: Return phone calls and document customer concerns [30 min]; Collect coins from washers/dryers/showers/vending machines; count & roll coins, record income, deposit coins in safe. [1 hour]		✓	✓	✓	✓	✓	
Janitor: Visually inspect for leaks, heat, vandalism; change security tape video; clean link from dryers; clean showers and toilets; sweep, mop & take out the garbage. [3 1/2 hours]		✓	✓	✓	✓	✓	

WEEKLY TASKS		
Make Sure You...	Day of week	✓
<i>Note: Weekly tasks for this example total 30 min/day each for the manager and the janitor so that the Manager works 2 hrs/day and the janitor 4 hrs/day.</i>	Sunday	
Janitor: buff 1/2 floors [30 min] Manager: monthly or annual task [30 min]	Monday	✓
Janitor: buff 1/2 floors [30 min] Manager: monthly or annual task [30 min]	Tuesday	✓
Manager & Janitor: attend staff meeting [30 min]	Wednesday	✓
Janitor: complete any janitorial work orders [30 min] Manager: monthly or annual task [30 min]	Thursday	✓
Janitor: vacuum dryer coils [30 min] Manager: monthly or annual task [30 min]	Friday	✓
<i>Note: The janitor has 30 min allowed to complete work orders during the week.</i>	Saturday	

Exercise 4-2 Write a CCR**Exercise 4-2****Materials Needed**

- Water test results for the students' water systems or photocopies of the Blue River Water System data from the instructor's manual and photocopies of completed Blue River Water System CCR for 2005.
- Computer(s) for the student(s), MSWord CCR template or CCR Writer Software; or photocopies of CCR form from student manual

Write a CCR using one of the following 2 methods:

1. Complete a CCR for your utility for the past year using real water system data. Either use the template provided on disk and write the CCR with a computer, use the CCR Writer program, or fill in the blanks on the form provided at the end of the Unit. Add pages to the form when necessary.
2. It is June of 2006 and CCRs are due at the end of the month. Have the student(s) complete a practice CCR for the Blue River Water System for the year 2005. Use the form provided at the end of the Unit and the water system data for the year 2005 provided on pages 2 & 3 of the exercise. An example answer is provided on page 4 & 5.

MAKE ONE COPY OF PAGE 1-5 FOR EACH PERSON

Exercise 4-2 Write a CCR

Sample water system data for the year 2005

When you get a "data dump" about your water system from ADEC, it might look something like this (at least this was the format in the summer of 2002. ADEC is currently working on a new computer system that will provide a more user friendly data output). The actual "data dump" this was extracted from was over 40 pages long, so this is just a sample of the kind of information you would get from ADEC.

FACILITY INVENTORY

PWSID: 312345 status: A class: A district: 0 fileno: 000.00.001
 system name: Blue River Water System system phone: 9075551234
 AKA names: FAX: 9075554321
 addressee: John Doe
 address: P.O. Box 123
 Blue River AK 99999

region: 0 certified op: Q
 owner type: 4
 svc connections: 2 vulnerable: N
 residents: 140 regulator: S
 non-resident pop: 0 system startup: 11/01/91
 service cat: MU deactivate date:
 strategy: Y survey date: 03-19-04
 target: Y surveyor: S. ANITARIAN
 lab access: Y rmt vil id:

This section provides general information on the water system, such as contact information and population served.

location: ON BLUE RIVER

comments: EAST FORK OF THE BLUE RIVER
 SYSTEM REPLACED 1991
 Tanks are filled about every 3 months.
 cc Village Council on every letter
 Council office fax 555-4321
 Washeteria phone 555-9876
 John Smith, Water Treatment OIT

This section shows the results of the bacteriological tests that have been taken

BACTI SAMPLE HISTORY

SAMPLE	DATE	TYPE	MTHD	COLI	OB	HPC	LABNUM	ENTRY DATE	LOCATION
12/19/05	R	PA	ND	NT	NT	MK19150	01/02/06	KITCHEN SINK	
12/03/05	R	PA	ND	NT	NT	MK19129	12/18/05	MAIN TANK	
11/13/05	R	PA	ND	NT	NT	AK5497DR	11/21/05	PUMPHOUSE WATER PT	
10/04/05	R	PA	ND	NT	NT	MK19154	10/11/05	HOLDING TANK	
09/05/05	R	PA	ND	NT	NT	AK5497DD	09/14/05	WATER PT	
08/27/05	R	PA	ND	NT	NT	AK5497	09/04/05	WATERING PT	
07/11/05	R	PA	ND	NT	NT	AK5497D	07/19/05	WATERING PT	
06/05/05	R	PA	ND	NT	NT	AK5497	06/12/05	WATER PT	
05/01/05	R	PA	ND	NT	NT	MK19146	05/08/05	DRINK FOUNTAIN	
04/02/05	R	PA	ND	NT	NT	MK18559	04/10/05	DRINKING FOUNTAIN	
03/06/05	R	PA	ND	NT	NT	MK18562	03/13/05	DRINKING FOUNTAIN	
02/28/05	R	PA	ND	NT	NT	MK18597	03/07/05	SCHOOL DRINKING FOUN	
02/22/05	R	PA	OLD	NT	NT	MK18561	09/13/05	DRINKING FOUNTAIN,	
01/24/01	R	PA	ND	NT	NT	MK18560	02/05/05	BLUE RIVER SCHOOL	

INORGANIC SAMPLE HISTORY

sample date : 05/08/05 sample type : R lab number : *F203742
 sample location :

CONTAMINANTS (ug/l)

antimony : ND	lead :
arsenic :	mercury :
asbestos :	nickel : ND
barium :	nitrate : 110
beryllium : ND	nitrite :
cadmium :	total ate+ite :
chromium :	selenium :
cyanide : ND	thallium : ND
fluoride :	silver :

This section shows the results of the tests for inorganic contaminants

(Continued on next page)...

... (Continued from previous page)

OPERATOR SAMPLE HISTORY

SMPL	TMON	TDAYS	TURB	TDAYS	EP	EP	DIST	DIST	FMON	FDAYS
DATE	DAYS	UNDER	PERF	OVER	CDAYS	CDAYS	CDAYS	CL	DAYS	OVER
			VIO	5 ntu		UNDER		ND		2.0

10-01-05	0				31	0	0			
08-01-05	0				31	0	0		0	
07-01-05	DNF				31	0	0		0	
06-01-05	0				30	0	0			
05-01-05	DNF				26	0	0			
03-01-05	DNF				28	0	0			
02-01-05	0				22	0	0		0	
01-01-05	0				20	1	0			

This section shows the results from the monthly operator reports

DNF = Did Not Filter, TMON.DAYS = # days turbidity was monitored

TDAYS UNDER = # days turbidity was < 1.49 NTU, TDAYS > 5 NTU = # days NTU was > 5

TURB PERF VIO = Whether or not there was a turbidity performance violation

CMON.DAYS = chlorine monitoring day(s), EP = Entry Point Chlorine

ORGANIC SAMPLE HISTORY

sample date : 05-08-05 method : 524.2 labnum : *A172510

CONTAMINANTS (ug/l)

1,1,dichloroethylene : ND	monochlorobenzene : ND
1,1,1 trichloroethane : ND	o-dichlorobenzene : ND
1,1,2 trichloroethane : ND	p.dichlorobenzene : ND
1,2, dichloroethane : ND	styrene : ND
1,2, dichloropropane : ND	tetrachloroethylene : ND
1,2,4 trichlorobenzene: ND	toluene : 0.33
benzene : ND	trans-1,2-dichloroethylene : ND
carbon tetrachloride: ND	trichloroethylene : ND
cis-1,2-dichloroethylene: ND	vinyl chloride : ND
dichloromethane : ND	total xylenes : ND
ethylbenzene : ND	TTHM : 8.16

This section shows the results of the tests for organic contaminants

VIOLATION HISTORY

vio num	violation		contaminant	result	period		closed
	type	cat			begin	end	
0231360	36	A	DIST.CMON.DAYS		12-01-05	12-31-05	
0231361	36	X	EP.CMON.DAYS		12-01-05	12-31-05	
0231252	36	A	DIST.CMON.DAYS		11-01-05	11-30-05	
0231253	36	X	EP.CMON.DAYS		11-01-05	11-30-05	
0231075	36	A	TMON.DAYS		10-01-05	10-31-05	
0231076	36	X	DIST.CMON.DAYS		10-01-05	10-31-05	
0230044	36	A	DIST.CMON.DAYS		09-01-05	09-30-05	
0230045	36	X	EP.CMON.DAYS		09-01-05	09-30-05	
0132461	36	A	TMON.DAYS		08-01-05	08-31-05	
0132462	36	X	DIST.CMON.DAYS		08-01-05	08-31-05	
0132360	36	X	DIST.CMON.DAYS		07-01-05	07-31-05	
0132017	36	A	TMON.DAYS		06-01-05	06-30-05	
0132018	36	X	DIST.CMON.DAYS		06-01-05	06-30-05	
0131908	36	A	DIST.CMON.DAYS		05-01-05	05-31-05	
0131818	36	A	DIST.CMON.DAYS		04-01-05	04-30-05	
0131819	36	X	EP.CMON.DAYS		04-01-05	04-30-05	
0131255	36	A	DIST.CMON.DAYS		03-01-05	03-31-05	
0131109	36	A	TMON.DAYS		02-01-05	02-28-05	
0131110	36	X	DIST.CMON.DAYS		02-01-05	02-28-05	
0130994	36	A	TMON.DAYS		01-01-05	01-31-05	
0130995	41	A	EP.CDAYS.UNDER		01-01-05	01-31-05	
		02/21/05	EP chlorine < 0.2 mg/l				
0130996	36	X	DIST.CMON.DAYS		01-01-05	01-31-05	

This section shows what violations have been generated for the water system

WAIVER HISTORY

wav.num	waivers requested	period	app recvd	issued	denied
9999999	SOCALL*003	2005-2007	02-15-05	04-14-05	
9999998	SOCALL*003	2002-2004	05-28-02	07-18-02	
9999997	SOCALL*003	1999-2001	06-25-99	08-20-99	
9999996	SOCALL*003	1996-1998	03-16-98	03-24-98	
9999995	SOC, ASBESTOS, DIOXIN	1993-1995	12-07-94	03-23-95	

This section shows what waivers the water system has

Consumer Confidence Report for 2005

We're very pleased to provide you with this year's Water Quality Report. We want to keep you informed about the water and services we have delivered to you over the past year. Our goal is to provide to you a safe and dependable supply of drinking water. Distributing this report is a new, annual federal requirement.

Water System Information

Water System Name: Blue River Water System	PWS#: 3123435
Address: P.O.Box 123	
City, State, Zip: Blue River, AK 99999	
Contact Person: John Doe	Tel#: (907) 555-1234
Date(s) of Regularly Scheduled meeting(s): first Thursday every month 5 pm	
Population Served: 140	Number of Connections: 2
Date of report distribution: July 1, 2006	For Calendar Year: 2005

Water Source Information

Ground Water Sources (springs, wells, infiltration galleries) The Blue River Water System does not use ground water	
Source 1 Name: N/A	Location description: N/A
Source 2 Name: N/A	Location description: N/A
Ground water contamination source(s) (if known):	
Surface Water Sources (lakes, rivers, creeks):	
Source 1 Name: Blue River	Location description: 400 feet North of the water treatment plant
Source 2 Name: N/A	Location description: N/A
Surface water contamination source(s) (if known): no known Contamination sources	
Source water assessment or protection plan availability: available at Tribal Office	

Waivers

There are many regulations pertaining to sampling and monitoring of our water system. We did not test for the following contaminants because we had a waiver. These contaminants are very unlikely to occur in our area. The waiver reduces sampling costs for your water utility and saves you money.			
Our utility has a waiver from sampling for (circle those that apply):	Asbestos	Synthetic Organic Contaminants	Other Organic Contaminants
Other waivers:			

Compliance Violations

Treatment Techniques: No violations	Monitoring/Reporting: Distribution chlorine for Jan-Dec '05
Record Keeping: No violations	Special Monitoring Requirements: None
Administrative or judicial orders: None	
Other or action taken to correct violation: Violations for entry point chlorination and turbidity monitoring for 5 months in 2005. Action taken: We are purchasing a new turbidimeter so we take monitor for turbidity, and we are taking our Chlorine residual reading once a month at the point we take the monthly bacteriological sample. We will turn in our monthly operator reports with at least 20 days of entry point Chlorine monitoring.	

TEST RESULTS							
Contaminant	Sample Date	MCL Violation	Level Detected	Unit Measurement	MCLG	MCL	Likely source of contamination to the best of our present knowledge
Microbiological Contaminants							
Total Coliform Bacteria	Every month	NO	ND	Detect/Non-detect	0	Note (1)	Naturally present in the environment
Fecal coliform and <i>E.coli</i>				Detect/Non-detect	0	Note (2)	Human and animal fecal waste
Note (1) one is a total coliform positive				Note (2) one is a fecal coliform or <i>E. coli</i> positive			
Turbidity							
Turbidity	*			NTU	n/a	Note (1)	Soil runoff
Turbidity				NTU	n/a	Note (2)	Soil runoff
Note (1) highest value for the year, recorded in (insert month); Highest allowable Treatment Technique value is () NTU							
Note (2) lowest monthly % of days the samples were below the Treatment Technique value of () NTU							
Radioactive Contaminants							
Alpha emitters				pCi/1	0	15	Erosion of natural deposits
Inorganic Contaminants							
Antimony	5/8/05	no	ND	ppb	6	6	Discharge from industry
Arsenic				ppb	n/a	50	Erosion of natural deposits
Asbestos				MFL	7	7	Decay of asbestos deposits
Barium				ppm	2	2	Erosion of natural deposits
Beryllium	5/8/05	no	ND	ppb	4	4	Discharge from industry
Cadmium				ppb	5	5	Corrosion of galvanized pipes
Chromium				ppb	100	100	Discharge from industry, erosion of natural deposits
Cyanide				ppb	200	200	Discharge from industry
Fluoride				ppm	4	4	Erosion of natural deposits; water additive which promotes strong teeth
Mercury (inorganic)				ppb	2	2	Erosion of natural deposits; Discharge from industry
Nickel	5/8/05	no	ND	ppb	0	100	Discharge from industry
Nitrate	5/8/05	no	0.11	ppm	10	10	Leaching from septic tanks, sewage
Nitrite (as Nitrogen)				ppm	1	1	Leaching from septic tanks, sewage
Selenium				ppb	50	50	Discharge from industry
Thallium	5/8/05	no	ND	ppb	0.5	2	Discharge from industry
Lead and Copper							
Lead				ppb	0	AL=15	Corrosion of household plumbing
Copper				ppm	1.3	AL=1.3	Corrosion of household plumbing
Volatile Organic Contaminants							
Benzene	5/8/05	no	ND	ppb	0	5	Discharge from factories
Chlorobenzene	5/8/05	no	ND	ppb	100	100	Discharge from industry
Ethylbenzene	5/8/05	no	ND	ppb	700	700	Discharge from petroleum refineries
Trihalomethanes	5/8/05	no	8.16	ppb	0	100	By-product of water chlorination
Toluene	5/8/05	no	0.33	ppm	1	1	Discharge from petroleum factories
Xylenes	5/8/05	no	ND	ppm	10	10	Discharge from industry
Other Contaminants Found							
Health Effects The health effects of any contaminants found that exceed the MCL are listed below							
Contaminant	Health Effects Turbidity was not monitored during 2005 because our equipment did not work.						
*Turbidity	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease causing organisms. These organisms include bacteria, viruses, and parasites that cause symptoms such as nausea, cramps, diarrhea and associated headaches.						

Exercise 6-1

A Case Study

Instructor's Directions:

Ask for volunteers to act as the following roles:

The Tribal Administrator (who also acts as the Utility Manager)

The Primary Water Plant Operator (there is no alternate operator at this time)

The Remote Maintenance Worker (RMW based out of Fairbanks)

The Village Public Safety Officer (VPSO)

The ADEC Drinking Water Specialist (based out of Fairbanks)

A Homeowner that gets piped water from the water system (located near the water plant on the return side of the loop).

Read the case study aloud. Then open it up for discussion.

This case study is about a community in Interior Alaska (think very cold winters with permafrost ground). The water source is a 300 foot deep well. After the water from the well enters the treatment plant, it is heated, chlorinated, then goes to a large insulated steel reservoir. There is one continuous water main that starts at the water plant, loops through the community providing water service to 100 homes, and returns to the water plant. Pumps in the plant provide a continuous flow of water in the pipe, and heat is added to the circulating water at the water plant, so that the water in the pipes will not freeze. This community has no written Emergency Response Plan.

At about 8pm on a Friday evening in February, the generator at the power plant had a voltage fluctuation that caused a short "brown out" across the community. The power came back up to normal fairly quickly. It had somehow corrected itself. Ask each of the participants if at this time (just after the "brown out") they would take any action.

Some discussion time.

Now make the following assumptions:

The Primary Operator left the village at 5pm, and is not scheduled back until Monday morning at 8am. Since the power came back up to normal fairly quickly, no one paid much attention to it. The Operator does not normally check the water plant on weekends. Monday morning comes, and the Primary Operator has not returned to the village. Ask each of the participants if at this time (Monday morning, everything seems normal) if they would take any action? *Some discussion time.*

Now make the following assumptions:

The Primary Operators came down with the "flu" while in Fairbanks, and ended up staying with relatives all week. The following Friday the Homeowner suddenly has no water. What do the participants do at this time? *Some discussion time.*

What actually happened: The "brown out" caused a breaker to flip in the water plant, shutting down the circulation pumps. No one noticed over the next week. The water in the pipe froze about half way through the loop (where the number of users started to get less and there was less water flow). The RMW was called to help. There were plug-ins for heat tape about every 400 feet along the water main. Portable generators were run 24 hours a day all week-end, but there was still one frozen section where the heat tape malfunctioned. Eventually water had to be rerouted in the plant to provide flow to both sides of the water loop, and the users had to have a continuous drip in their homes to prevent the line from refreezing. It finally thawed in July.

*Is there anything that could have been done to prevent this situation from happening?
Managerial? Technical?*

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Exercise 6-2

Security Vulnerability Assessment

Instructor's Directions:

1. Have the class participants break up into groups of two or three.
2. Each participant shall read through and complete the Security Vulnerability Self-Assessment for Small Water Systems based on what they know about their own utility. They can discuss the self-assessments with their group partners as they work.
3. State at the beginning that there may be some information about their own water system that they are not comfortable with sharing with their partners, or with the group as a whole, do to potential security concerns. That is OK. They can make stuff up about any utility if they prefer.
4. Each participants should note actions that need to be taken during the self-assessment.
5. After the participants have completed the self-assessments, noting actions that need to be taken, they should attempt to prioritize the actions on sheet Attachment 1.
6. They should also attempt to complete Attachment 2, sections 1 & 2. They should not worry about actual telephone numbers, but concentrate on the names, titles and agency affiliations of people to contact.
7. Section 3 will be covered in Exercise 6-3.
8. Leave time for discussion: *What have the participants discovered about security vulnerabilities at their utility? Are their critical items they believe need to be addressed immediately?*

Exercise 6-3

Contingency Planning*

Instructor's Directions:

1. Have the participants break up into groups of 4 to 6.
2. Distribute a copy of the "ADEC Notice of Violation letter".
3. Instruct the groups that they have 20 minutes to develop an action for handling this problem. They are to write the steps of this plan on a flip chart page, or whatever is available.
4. After 20 minutes, post the pages and go over the steps.
5. Ask the question: What would they write into their contingency plans to make this task easier?

*This exercise adapted from "Introduction to Utility Management", Alaska DCED, 1996

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STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

Division of Environmental Health
Drinking Water Program

FRANK MURKOWSKI, GOVERNOR

410 Willoughby Ave, Ste 105
Juneau, AK 99801-1795
PHONE (907) 465-5065
FAX: (907) 465-5070
<http://www.state.ak.us/dec/home.htm>

August 5, 2004

Mr. John Smith, Operator
Rocky Point Utilities PWSID # 012345
Box 123
Rocky Point, AK 99999

SUBJECT: BOIL WATER NOTICE

Dear Mr. Smith,

The Department was informed that there was an equipment failure at the water treatment plant and the adequate disinfection was not taking place for a period of time resulting in a positive fecal coliform bacteria test result. As a result of this test a boil water notice needs to be issued as per State of Alaska drinking water regulations. Please disseminate the notice as soon as possible according to your contingency plan, so that all residents are aware of the problem, know what to do about it and have an idea of when the problem might be fixed.

Your cooperation in this public notice is appreciated. If you have any questions, don't hesitate to call and ask.

Sincerely,

Reggie Ulator

Reggie Ulator
Drinking Water Specialist

P.S. We highly recommend that replacement parts be kept on hand for your chlorinator, or even a spare chlorinator unit so that the risk of serving improperly treated water to your customers is reduced.

MAKE ONE COPY FOR EACH PERSON

BOIL WATER NOTICE

Samples from the Rocky Point Utilities public water system show that the water may have been contaminated.

This BOIL WATER NOTICE is in effect August 5, 2004 until further notice.

Boil water 2 minutes before drinking

For more information call the Alaska Dept. of Environmental Conservation office in Juneau at 456-5326.

Department of Environmental Conservation
410 Willoughby Ave.
Juneau, AK 99801

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